ROCK PRODUCTS

FEBRUARY, 1948 — THE INDUSTRY'S RECOGNIZED AUTHORITY — VOL. 51, No. 2

Bror Nordberg, *Editor*

Stanley A. Phillips, *Manager*

Nathan C. Rockwood, *Editorial Consultant*

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Ralph S. Torgerson, Managing Editor
Walter B. Lenhart, Associate Editor
David Mocine, Associate Editor
M. K. Smith, Assistant Editor
J. Sedlack, Assistant Editor

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"WE HEAR..."

February, 1948

California led all other states in new construction activities in the first nine months of 1947 with a total figure of $1,250,100,000, or about 14 per cent of total U. S. construction expenditures. Texas and New York were second and third, respectively, and together accounted for another 14 per cent, according to the Commerce Department.

* * * * * * * * * * *

Building construction costs have been upped 25 to 40 per cent by A.F.L. building trades unions, declared Rep. Gwinn, R., N. Y.

* * * * * * * * * * *

With the present Federal Aid Highway Program expiring this year, Representative Cunningham, chairman of the House public works subcommittee on roads, is suggesting a 10 year program costing as high as $800,000,000 annually. It was stated that the figure given was a maximum, and that $500,000,000 would be a good average. At the closing session of its 33rd annual meeting, held recently in New York, the American Association of Highway Officials passed a resolution petitioning Congress to authorize not less than $500,000,000 annually for highway aid for the next three years.

* * * * * * * * * * *

Late in 1947, quarry operators in Derbyshire, England, were hit with an embargo from the railway company on "Pool wagons" (freight cars) for hauling limestone. Following action taken by the industry, the embargo was soon lifted to the extent of 50 per cent to accommodate limestone for the chemical and steel industries.

* * * * * * * * * * *

More than ten per cent of all highway construction placed under contract in the nation during the first nine months of 1947 was in Pennsylvania, where 1640 miles of road were affected.

* * * * * * * * * * *

A gravel company employe was seriously injured recently when he released the brakes on two freight cars, failing to notice a third empty following. The empty crashed into the car carrying the employe, knocking him to the ground and running over his right arm and leg. Again we emphasize the need for a complete safety program, covering every phase of plant operation.

* * * * * * * * * * *

Thirty-two per cent of the federal aid highway funds authorized under the 1944 Federal-aid Act were under contract as of October 1, 1947, 24 months from the time the first funds were made available to the states. Still available then were $546 million.

* * * * * * * * * * *

In the first court ruling on the discharge-for-cause provision of the Taft-Hartley law, a circuit court of appeals upheld the National Labor Relations Board in ordering an employer to reinstate, with back pay, a group of discharged union workers. The court found that the employer, in reducing his force for business reasons, fired a disproportionate number of union members.

* * * * * * * * * * *

WE HEAR

In 1947, coal supplied 47 per cent of the energy consumed by industry in the U. S., compared to 80 per cent in World War I. Other current figures are: oil, 30 per cent; natural gas, 12 per cent; and hydro-electric power, 11 per cent. Figures for the earlier period were: oil, 12 per cent; natural gas and hydro-electric power, both 4 per cent.

* * * * * * * * * * *

The Department of Commerce requires that businessmen keep all records relating to goods and services formerly under price control until November 9, 1949.

* * * * * * * * * * *

The Federal Works Agency sees a public construction program costing $3,700,000,000 in 1948, or a 25 per cent increase over last year's total. This figure includes Federal funds as well as state and local expenditures. The FWA also forecasts a 10 billion dollar private construction figure, based on 1947 prices.

* * * * * * * * * * *

Diversion of state highway user funds to non-highway purposes during 1946 totalled $94,579,000, according to the Public Roads Administration. This figure represents a continued downward trend in diversion.

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According to Barron's index, business volume reached a new post-war high of 118.9 in second week in December over 118.6 for prior week.

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November boxcar deliveries topped retirements for the second month in the year, with 7998 cars delivered and 5102 retired. Though total deliveries of 65,588 new cars in 11 months of 1947 were short 1282 over retirements, total cars on order December 1 by Class I railroads equaled 125,395.

* * * * * * * * * * *

Crowded colleges and universities have planned a $1.5 billion construction program for completion between now and 1950. Due to high costs, new college construction has totalled only $175 million since the war's end.

* * * * * * * * * * *

According to Commerce Department estimates, private home construction reached a record of $4,939,000,000 in 1947; but as a grain of salt, added "the record was due in part to increased prices." New dwelling units started last year numbered more than 860,000. Forecast for 1948 is for an expenditure of six billion dollars on 950,000 units started.

* * * * * * * * * * *

F. W. Dodge Corp. reports that investment commitments for construction in the 37 states east of the Rocky Mountains increased 42 per cent in November, 1947, over the same month in 1946.

* * * * * * * * * * *

Motorists used 11.2 per cent more gasoline during the first six months of 1947 than during the corresponding period in 1946. With vehicle mileage reaching astronomical figures, the highway construction program must keep pace to furnish safe and easy routes, according to C. M. Upham, engineer-director, American Road Builders Association.

* * * * * * * * * * *

A new directory has just been issued listing all U. S. Employment Service offices and affiliated public-employment offices. This directory may be obtained from any local office or the Washington headquarters of the U. S. Employment Service.

* * * * * * * * * * *

In recent elections, Ohio voters approved a constitutional amendment barring diversion of highway-user taxes to other than road use--making this state the 20th to adopt such a law.

* * * * * * * * * * *

THE EDITORS

★ ★ Editor's Page

A Cooperative Approach to the Specifications Problem

THE EFFECTIVENESS with which national trade association activities may be coordinated with the work of regional associations in the advancement of even purely local objectives was thoroughly demonstrated to us in Harrisburg, Penn., last month.

Pennsylvania has a 1948 highway building program that will shatter all state records, and the occasion was a meeting of aggregates producers and the construction industry, to which top engineering officials of the highway department were invited. Mutual cooperation in furtherance of the program was the goal.

This meeting was unique at least in our experience. It was initiated by the producers of aggregates—crushed stone, sand and gravel and slag—through their respective state associations. They recognized the need to talk things over on a common ground with their largest customer in order that they can most effectively do their part toward helping complete a program that can only approach fulfillment through dovetailing of effort.

Competitive Industries Cooperate

Getting the three aggregates industries in Pennsylvania together on any common ground is a precedent-shattering feat in itself. If there ever was more bitter competition for business than the battle that has been waged between the crushed stone and sand and gravel industries in Pennsylvania, it is outside the realm of the rock products industries. It is to their credit that they have gotten together, under the stress of the emergency at least, and that, as a result, the combined talents of all three organizations and the engineering experience and technical brains of the three parent national trade associations could be brought to bear, as they were at Harrisburg, on common objectives.

There are competitive differences between the several aggregates for specific uses, to be sure, but those advantages or disadvantages for one or the other material are not so important in Pennsylvania today as are factors relating to all three aggregates. Those factors are considerations affecting the production and delivery of maximum tonnage of any qualified aggregate, which involve acceptance standards that apply to either aggregate. Grading specifications, quantitative limitations on flat and elongated particles, standards for cleanliness of aggregate, standardization of sizes and soundness—applicable to all aggregates and having direct bearing on tonnage produced and rejections at the job—were up for discussion before top flight highway engineers.

Having put themselves on the spot with an ambitious program requiring several million more tons of aggregates than have yet been produced in a single year, the engineers are asking for every ton of aggregate that can be made available in 1948. Maximum tonnage produced, the fewest possible rejections and lowest possible cost—the objectives of any producer of aggregates—those are the aims of the highway engineer. What more perfect conditions can there be for the aggregates industries collectively to analyze, critically, with those who write the specifications, the provisions that work hardship and limit production and which might be adjusted to the benefit of both?

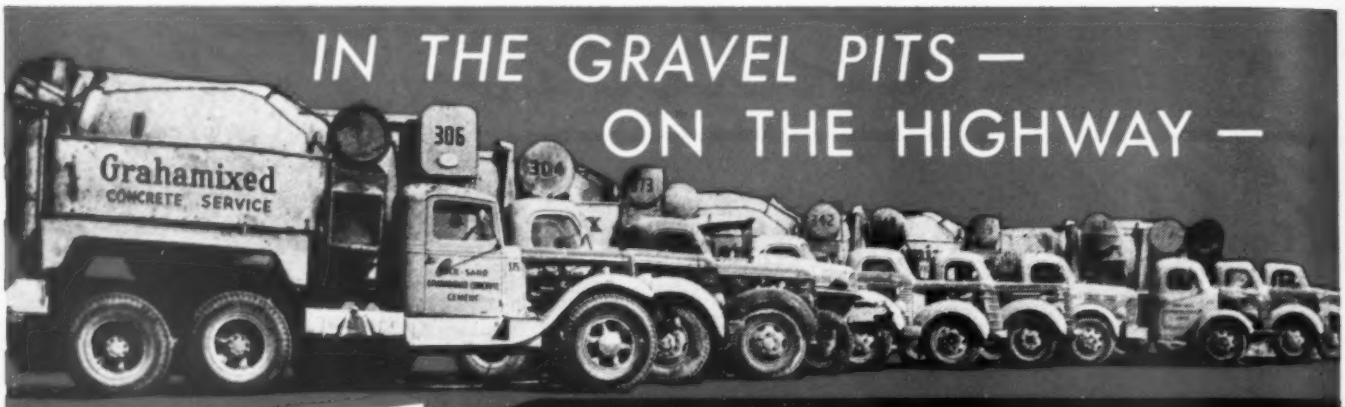
Pennsylvania, for example, limits the permissible amount of flat and elongated particles in large coarse aggregate to five per cent by weight. If that limit could be raised a few per cent, and it could be shown that no serious troubles would result, might it not be to the Department's interest to consider the economics of a compromise? Rejections in 1947 due to excess flats and elongated particles were not uncommon, we understand, and certain large producers of crushed stone had to close operations for failure of compliance. It costs a lot of money to change a plant over in order to accomplish a change of a per cent or two in the characteristics of an aggregate. Those companies which did effect a change have had to be satisfied with loss of production of as much as twenty or thirty per cent in some cases.

The net result of a specification like this is loss of total production at a time when that cannot be afforded, costly rejections at destination and, in the end, higher cost to the taxpayer. We do not suggest or infer that the Pennsylvania Highway Department change its specifications; we merely use this as an example of the topics.

The Pennsylvania Highway Department was extremely attentive to suggestions that were made and which were supported by technical data and research. It granted some concessions and will reconsider certain of its requirements in the light of suggestions presented. In turn its engineers presented cost-saving ideas to the producers.

Meetings like this one are bound to benefit producers in the long run, if not immediately. It was an educational session, without prejudice for or against any class of aggregate. There should be more like it.

Bror Nordberg



Tire cost is a major item in our type of operation. For that reason we must hold tire expense to the minimum. We do that by using Firestone All Traction Tires. They are money savers.

PAUL GRAHAM, President
Graham Brothers

IT'S Firestone FOR Graham Brothers of

LOS ANGELES, CALIFORNIA

FIRESTONE builds tires for every load, road and condition of service — tires fitted to the job.

For Graham Brothers in the rock and concrete business in Los Angeles, the tire that fills the bill is the Firestone All Traction. It has the traction for off-the-highway use and the roadability and long life for over-the-highway hauling. And it slashes costs.

The Firestone All Traction will do the same in any hauling operation that demands off-the-highway traction and on-the-highway roadability with long life.

Whatever your hauling job may be you can cut tire costs by equipping your trucks with Firestone Tires fitted for your specific job. Give them a trial. They will prove it.

GROUND GRIP ROCK GRIP EARTH MOVER

Firestone

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Rocky's NOTES

Nathan C. Rockwood

"The State and the Company"

THE TITLE above is that of a 214-page book—a collection of 53 brief radio speeches—describing the various activities of the Timken Roller Bearing Co. The preface says they constituted a weekly program on Sundays, broadcast through the local radio station, primarily for the enlightenment of the company's employes.

The collection appeals to us for several reasons: (1) It seems an excellent example for any business institution to build both good public and good employe relations; (2) it shows how to build confidence and pride in the company's products; (3) the addresses contain some excellent precepts of good business management that can be absorbed and applied in any business, big or little. The talks were apparently designed to be made in 10 or 15 minutes at the most.

We will not attempt here to be specific and identify the department head quoted in every instance, nor to quote verbatim, because of course the company name was used many times for a good reason that does not require our repeating it here. Our object is merely to call attention to some of the management wisdom found in this collection. It would be worth reading by any business executive

Management Wisdom

"The formula for success may be simple, but the actual working out of that formula requires close attention to hundreds of details. It means *tireless night and day devotion* to the many phases of operation, some interesting, some merely routine though indispensable."

The president of the company, Wm. E. Umstattd, said: "We can not have peace without prosperity and we can not have prosperity without full and continuous production on a sound economic basis. This essential production is impossible without harmonious relations between men who manage and the men who produce in American industry. * * * To begin with, the company wants above all to provide its men and women with steady employment. All the divisions of the company are devoted to that end. * * * It is a company policy to pay adequately for services rendered. Compensation is based on ability, responsibility, production, and capacity for growth.

"Since labor costs are, of course, the greatest factor in determining our highly competitive prices, in general, only when labor costs can be reduced by new methods of production, by increased plant capacity, individual output, and by raising the quality of products are high wages economically possible. * * * Certain rules and standards are necessary for orderly operation, and we want these rules, standards and disciplinary measures administered courteously and with justice. * * * We want to see established a spirit of fair play, through recognition by *all* of us of the equities or rights of all individuals and groups concerned with the operations of the company. In this connection, we, on our part, fully recognize that collective bargaining is not only here to stay—but that it is an *inherent right of labor.* * * * Only *in order*—in the acceptance by all men of their responsibilities as well as their rights—can we Americans remain individually and collectively free and great."

A. M. PONZE, vice-president in charge of manufacturing: "Labor secures its reward for effort in the form of wages—wages are the result of production. If production increases both in amount and quality, then wages can continue to rise. If not they must remain static or be decreased. Yet there are apparent in industry certain tendencies leading toward restriction of output or the establishment of the 'daily quota.' If these tendencies continue and become firmly rooted, we will find ourselves reversing the very process by which this nation became *the greatest of all nations.*

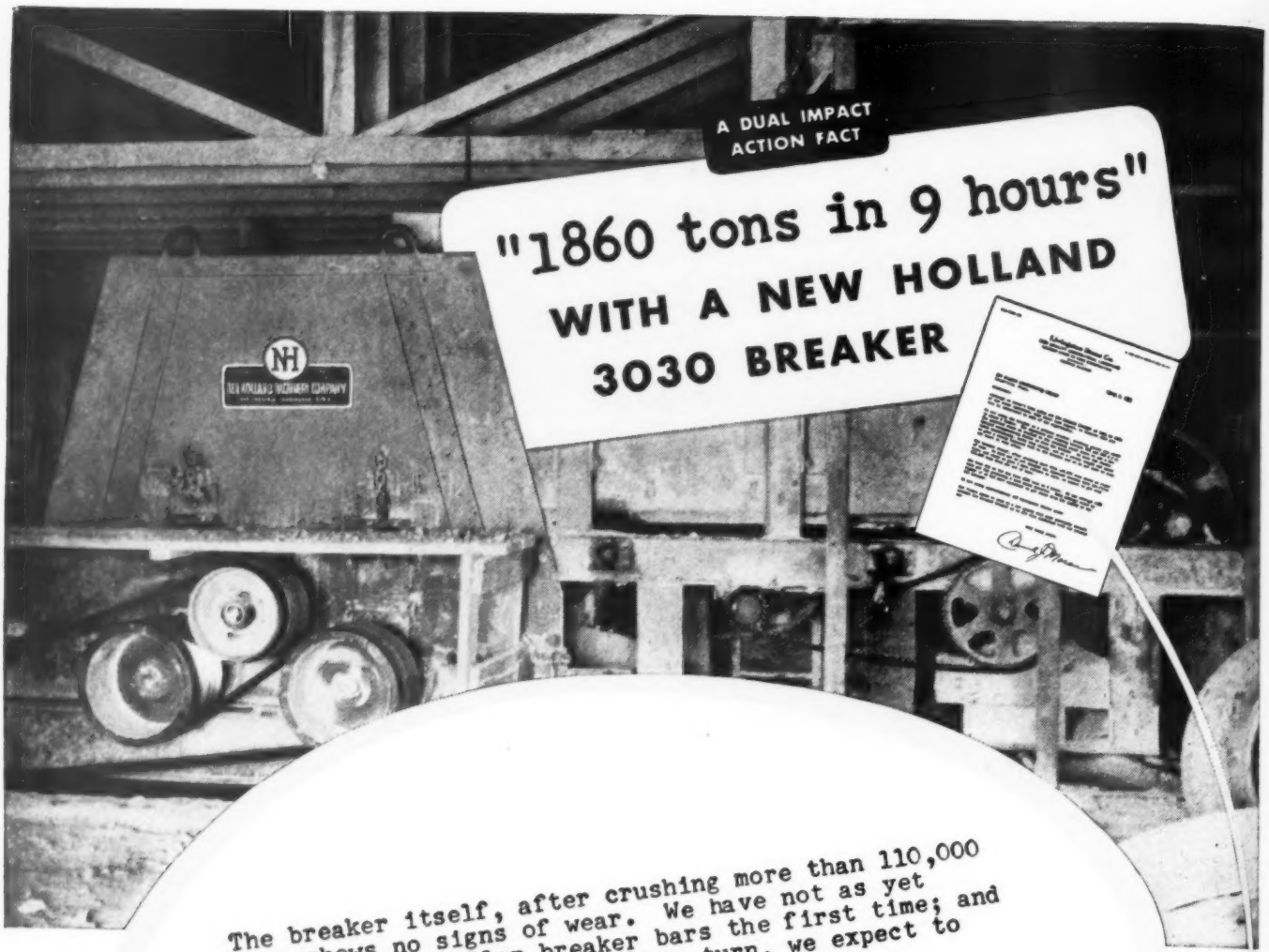
Sales Policy

W. B. MOORE, director of sales: "Every company has a sales policy built around three fundamental factors: price, quality, service. The significance of these three words is obvious. The truth is, however, that a company to be continuously successful must have a sales policy that is sound, is understood and approved alike by employes and customers, and is adhered to consistently. * * * That prices must be competitive is axiomatic. That prices must be stable and must be uniformly applied is not so well understood nor applied. Customers are annoyed by constantly changing prices and resent the necessity of trying to guess the best time to buy. * * * Our prices have never been based on what the customer will pay but rather on the cost of manufacture. We have seen other producers lose out entirely because they charged exorbitantly and then cut drastically to meet competition.

Financial Policy

J. A. RILEY, assistant secretary and assistant treasurer: "To make a success of a business, it is of course essential that profits be earned. * * * The application made of money resulting from profits is also a determining factor in whether or not there shall be continued future operations. * * * Probably the greatest single factor contributing to success in the business is the determination of the price to be charged for goods sold. Prices must be sufficiently high to cover all costs and expenses and to allow the essential margin for profit but still must not be above such prices as customers are willing to pay, or that competition will allow. If unreasonable prices are asked, customers are certain to turn to other sources of supply or to different articles entirely, which can be used as substitutes. When any business is able to and actually does make profits of an extraordinary percentage, competition loses no time getting in on the easy money. * * * Nicety in price setting demands sagacity of the highest order. * * * A manufacturing enterprise which hopes to keep in business must have available sufficient funds with which to purchase improved machinery and devices as they are developed and placed on the market. * * * However, the greatest caution must be exercised in making expenditures for expansion in plant facilities. Only accurate knowledge of conditions and the keenest of judgment can safely be used in determining the practicability of any such move. * * * Too great an expenditure for plant facilities of cash which is needed for current operations may bring a business venture to a sudden close."

Reasonably steady earnings of this company have permitted stockholders, during the past 20 years, to receive dividends of an approximate average of 5 per cent upon the market value of their holdings. Thus, from any angle, it can be assumed that this company has had successful management, and that the precepts of its philosophy of managements, while they contain nothing new, are worthy of note. We have given only a few quotations of many equally well thought out and succinctly expressed in language that most any reasonably intelligent person can readily understand. They present, as a whole, a novel way of disseminating the true philosophy of American enterprise, with which perhaps there are still even some executives none too familiar.



The breaker itself, after crushing more than 110,000 tons shows no signs of wear. We have not as yet changed the impeller breaker bars the first time; and since we have 3 more corners to turn, we expect to get over 500,000 tons from one set of bars.

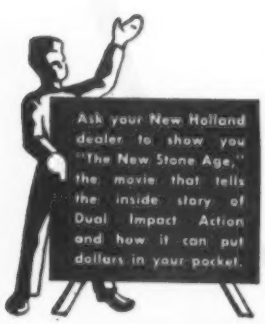
Our best day so far has been 1860 tons in 9 hours. We can average 1700 tons per day producing 2" minus material. This average would be higher if we had more equipment to get stone from the quarry to the New Holland.

We are using approximately 150 diesel horsepower.

Our future plans to open up a new quarry will most certainly include another New Holland breaker as we are very well satisfied with our present one.

Very truly yours,

David J Moran


Ask your New Holland dealer to show you "The New Stone Age," the movie that tells the inside story of Dual Impact Action and how it can put dollars in your pocket.

NEW HOLLAND DOUBLE IMPELLER Breakers

NEW HOLLAND MANUFACTURING
Mountville, Pennsylvania

the Personal Side of the news

President Retires

STIRLING TOMKINS, president, New York Trap Rock Corp., New York, N. Y., has retired after 21 years as an officer of the company. However, he will serve in the capacity of consultant and as a director. WILSON P. FOSS, III, a grandson of one of the founders of the corporation and a son of the chairman of the board, will succeed Mr. Tomkins as president. For the past two years, Mr. Foss has been vice-president in charge of production, which position will be assumed by Dexter M. Bullard, a graduate civil engineer, who has been with the corporation since 1936.

Credit Manager

V. C. TROUT has retired as credit manager and assistant treasurer of the Warner Co., Philadelphia, Penn., after 48 years of continuous service. Mr. Trout became associated with the Knickerbocker Lime Co., in 1899 as a bookkeeper and later was appointed treasurer and director. When this firm was absorbed by the Van Sciver Corp., he retained these positions, and when Warner Co. purchased Van Sciver he became assistant treasurer and manager of the credit and collection department.

JAMES E. HEWITT, recently appointed assistant credit manager, will succeed Mr. Trout as credit manager. He was formerly connected with the tabulating department and has been under Mr. Trout's supervision for several months.

A.S.T.M. Vice-Chairman

ELMER E. EAKINS, consulting technologist of the Pure Lime Corp., Berwick, La., has been named to replace James Murray as one of the vice-chairmen of Committee C-7, American Society for Testing Materials. Mr. Murray, chemical director of Warner Co., Devault, Penn., has severed his connection with the company to take up his duties as associate professor at the Massachusetts Institute of Technology in the Department of Building Engineering and Construction as professor of materials.

Universal Promotions

JOSEPH L. HOHL, assistant manager of the Hudson, N. Y., plant of the Universal Atlas Cement Co., New York, N. Y., has been appointed plant manager of the Leeds, Ala., plant, succeeding WILLIAM O. LAWRENCE, who has been advanced to assistant manager of the larger plant at Buffington, Ind. Mr. Hohl, a graduate in mining and metallurgy of the Colorado School of Mines, joined the company in 1926 as a draftsman at the Northampton, Penn., plant. Three years later he became associated with the Coplay Cement Manufacturing Co. as plant engineer and then superintendent. From 1941 to 1945 he saw service as field engineer with the Bethlehem Steel Corp. and the Research Corp. In 1945, Mr. Hohl rejoined Universal Atlas as assistant to plant manager at Hudson, N. Y., and a year later was appointed assistant plant manager. Mr. Lawrence joined the company in 1933 at Leeds, Ala., and served as operator in the burning department, laboratory technician, clerk in operating and construction departments, and draftsman, before going to the New York office for two years as field engineer. He returned to Leeds in 1942 as plant engineer and was appointed assistant plant manager in 1944.

Institute President

N. A. HOLMER, vice-president and sales manager of The Carney Co., Inc., Mankato, Minn., has been re-elected president of the Industrial Mineral Wool Institute, and T. C. CARTER, vice-president of the Eagle Pitcher Sales Co., Cincinnati, Ohio, has been named vice-president. E. T. Detgen, sales manager, Owens-Corning Co., Toledo, Ohio; W. H. Hill, president, Baldwin-Hill Co., Trenton, N. J.; Mr. Holmer and Mr. Carter were elected to the board of directors.

Named Manager

JAMES GILBERT MILLER, superintendent of engineering at the South Charleston, W. Va., plant of Westvaco Chlorine Products Corp., New York, N. Y., has been appointed resident manager of the new elemental phosphorous plant being constructed at Pocatello, Idaho. Mr. Miller has been associated with the company since 1930, first as project engineer at South Charleston, then plant manager at Carteret, N. J. He was assistant manager at South Charleston prior to his appointment as superintendent of engineering.

James G. Miller

JOSEPH B. PERRY, formerly mines manager in charge of magnesite, barite, dolomite and other non-metallic mineral production, has been named mines development manager. He will have charge of all mining operations in California, Nevada, Wyoming and Idaho, and will continue to maintain headquarters at the Newark, Calif., plant.

Joseph B. Perry

Ideal Personnel

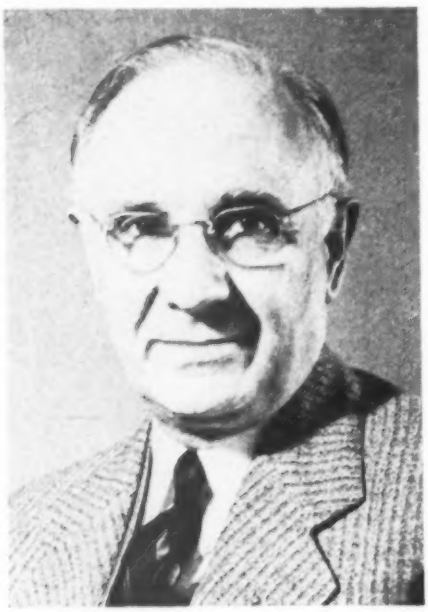
CLAUDE RODARMEL has been promoted from superintendent at the Ada, Okla., plant of Ideal Cement Co., Denver, Colo., to division superintendent of the Southern Division. GAYLE N. DAVIS, formerly plant superintendent at Superior, Nebr., will succeed Mr. Rodarmel as superintendent at Ada. F. G. MEYERS, plant superintendent at Portland, Colo., has been made plant superintendent at Superior, Nebr. STEPHEN A. GRETENCORT has been appointed plant manager and JOHN W. BAKER assistant superintendent at the Portland, Colo., plant. CHARLES A. REITER will succeed Howard L. Sleeper, who has retired, as cashier of the Colorado Portland Division.

On Turnpike Committee

LOUIS O. RICHTER, president of the Richter Concrete Co., Cincinnati, Ohio, has been appointed one of the directors of the Ohio Turnpike Committee.

Retires

WILBERT P. SABIN, vice-chairman of the executive committee of the Ash Grove Lime and Portland Cement Co., Kansas City, Mo., has retired after 40



Wilbert P. Sabin

years of service with the company but will continue to be a member of the board of directors. Mr. Sabin joined the company in 1908 as general auditor and subsequently became assistant to the president and executive vice-president. He has served on many committees of the Portland Cement Association, National Lime Association, and National Safety Council. Mr. Sabin has always been greatly interested in plant safety activities, and as a member of the P.C.A. Accident Prevention Committee, aided in the formulation of practices and policies which have contributed to the outstanding safety record of the cement industry.

A.C.I. Nominees

ROBERT F. BLANKS, chief, engineering and geological control and research, U. S. Bureau of Reclamation, Denver, Colo., has been nominated president of the American Concrete Institute, Detroit, Mich. HERBERT J. GILKEY, head, Department of Theoretical and Applied Mechanics, Iowa State College, Ames, Iowa, has been nominated vice-president for one year; and FRANK H. JACKSON, senior engineer of tests, Public Roads Administration, Washington, D. C., as vice-president for two years.

Directors nominated for one year term are: R. E. Copeland, director of engineering, National Concrete Masonry Association, Chicago, Ill.; Paul W. Norton, consulting engineer, Boston, Mass.; and William H. Klein, operating manager, Lawrence Portland Cement Co., Northampton, Penn.

Two year term directors are: A. J. Boase, manager, structural bureau, Portland Cement Association, Chicago, Ill.; George W. Washa, associate professor of mechanics, College of Enginering, University of Wisconsin, Madison, Wis.; and A. T. Goldbeck, engineering director, National Crushed Stone Association, Washington, D. C.

Directors nominated for three-year term are: Charles H. Scholer, head, department of applied mechanics, Kansas State College, Manhattan, Kans.; Myron A. Swayze, director of research, Lone Star Cement Corp., New York, N. Y.; Hugh P. Bigler, executive vice-president, Connors Steel Co., Birmingham, Ala.; and Roderick B. Young, assistant director of research, Hydro-Electric Power Commission of Ontario, Toronto.

Asphalt Institute Engineer

HERMAN C. HELMLE, formerly a chemist with the Illinois Division of Highways, has been appointed district engineer in charge of the new Springfield, Ill., office of The Asphalt Institute, New York, N. Y. The territory to be covered by Mr. Helmle includes the states of Illinois, Wisconsin, Minnesota, Iowa, Missouri, and Arkansas, which are a part of the Institute's Division III. INGHRAM GRAYSON of Lion Oil Refining Co. and a vice-president of The Asphalt Institute, heads the Management Committee for this division.

Plant Manager

J. L. MILLER, production superintendent of the Zelienople, Penn., plant of Johns-Manville Corp., New York, N. Y., has been appointed manager of the plant. He succeeds S. K. Cooper, who has resigned. Mr. Miller joined the company in 1934 as a laboratory assistant. Two years later he was promoted to assistant research engineer and in 1938 was advanced to research engineer.

Elected President

JOHN V. COLLIS, chairman of the executive committee and a director of the Federal Chemical Co., Louisville, Ky., has been elected president of the company. JEFFERSON D. STEWART, JR., also a director, was elected vice-president. The company owns phosphate mines in middle Tennessee and operates plants in Nashville, Tenn., Meridian, Miss., Columbus, Ohio, as well as in Louisville, Ky.

Mineral Consultant

JULIAN W. FEISS, editor of The American Mining Congress Journal for the past two years, has been appointed mineral consultant and assistant to the director of the Bureau of Mines. Mr. Feiss has had wide experience as a mining engineer, mineral economist and writer for technical and non-technical magazines and publications in the field of minerals and mining engineering. He is a member of the Society of Economic Geologists and of the American Institute of Mining and Metallurgical Engineers.

A.R.B.A. Chairman

HARVEY A. SCRIBNER, president of Russell T. Gray, Inc., advertising agency, Chicago, Ill., has been named chairman of the 1948 road show committee by the American Road Builders' Association. The show will be held at Soldier Field in Chicago, July 16 to 24, 1948. FLOYD O. BOOE, of San Francisco, Calif., well known in the highway construction field, has been retained by the Association to conduct a two-months' survey of 11 Western states for the possible opening of the American Road Builders' Western Association. Mr. Booe's experience in this field includes ten years as secretary of the Nevada Highway Commission and 20 years as manager of the Northern California Chapter, Associated General Contractors.

President H. X. Eschenbrenner (center) chats with his two vice-presidents during intermission at first annual sales conference of Universal Concrete Pipe Co. On Mr. Eschenbrenner's right is George Malfregeot, vice-president in charge of the Syracuse, N. Y., district office, and on the left is Harry Leuliette, vice-president in charge of Eastern sales, New York City

On U. S. Chamber of Commerce Committee

JOHN C. BEST, vice-president of the National Gypsum Co., Buffalo, N. Y.; WILLIAM M. KINNEY, vice-president and secretary of the Portland Cement Association, Chicago, Ill.; and CHARLES WARNER, president of Warner Co., Philadelphia, Penn., have been appointed members of the Construction and Civic Development Committee of the United States Chamber of Commerce, Washington, D. C., for the coming year.

Credit Manager

GEORGE P. MAHAN, JR., has been appointed credit manager for the Cumberland Portland Cement Co., Chattanooga, Tenn. A graduate of the University of Tennessee, Mr. Mahan had for some years been employed in the auditing division of the Tennessee Valley Authority and more recently had been in business for himself in Knoxville, Tenn.

Speaks on Lime Industry

NORMAN SCHAFTER, superintendent of the Marblehead, Ohio, plant of the Kelley Island Lime and Transport Co., Cleveland, Ohio, was guest speaker at a recent meeting of the Rotary Club. He told of the geological formations of northern Ohio which formed the background of the lime industry and development of the company's activities at the Marblehead plant.

Heads Credit Department

WILLIAM C. ANDERSON, formerly assistant credit manager, Marquette Cement Manufacturing Co., Chicago, Ill., will head the credit department recently opened at the sales offices in Memphis, Tenn. The department will handle credit matters on all sales made by the Memphis division, which comprises the States of Mississippi, Louisiana, Arkansas, Kentucky and Tennessee.

Named Superintendent

JAMES V. DAILEY, assistant superintendent of the Manitowoc Portland Cement Co., Manitowoc, Wis., has been appointed superintendent to succeed Frank E. Town, who passed away suddenly on December 2. Mr. Dailey has been associated with the company since his graduation from Michigan State College in 1932, and has spent most of his time between the Manitowoc, Wis., and Bay Bridge, Ohio, plants.

U. S. Visitor

P. B. ADUR, chemical engineer for Associated Cement Co's., Ltd., Bombay, India, was a recent visitor to the United States for the purpose of inspecting cement plants in this country and called at the offices of ROCK PRODUCTS.

OBITUARIES

HARRY G. ELAM, Elam Brothers Corp., Rochester, N. Y., died at his home after a long illness. Mr. Elam was treasurer of the sand and gravel firm that was founded by his father. His surviving brothers are Adelbert and Howard, respectively president and secretary of the company. In addition to his brothers, he leaves his wife, two sons and a daughter.

THEODORE ROOSEVELT PRELL, district sales manager, Indiana-Michigan district, Universal Atlas Cement Co., Chicago, Ill., died suddenly at his home in LaGrange, Ill., on December 31. Mr. Prell joined the company at Chicago in 1929, was made correspondent in 1934 and, one year later, was appointed to the position he held at the time of his death.

JOSEPH W. MCFARLAND, president and general manager of the National Gypsum Co., and a native of Melrose, Mass., died December 8 at Halifax, Nova Scotia, after a brief illness. He went to Canada in 1912 as superintendent of the new Ross manganese mines. He was 55 years old.

ROBERT L. JEROME, operator of a concrete block plant at Lordstown, Ohio, died December 21 at the age of 67.

AUGUST MALFREGEOT, superintendent of the Universal Concrete Pipe Co. plant at Syracuse, N. Y., and son of George Malfregeot, vice-president of the company, died January 5 after a brief illness. He was 29 years old and had been with the company for more than 10 years.

BERNARD L. JOHNSON, nationally known building magazine editor, architect, and building consultant, died December 23 in Seattle, Wash., at the age of 64. Mr. Johnson was editor-in-chief of the American Builder and Building Age, Chicago, Ill., from 1908 to 1943.

JAMES DICKSON, a retired engineer for the Buffalo Sand and Gravel Co., Buffalo, N. Y., died recently after a brief illness. He was 77 years old.

GEORGE A. BREWER, president of the Longview-Saginaw Lime Works, Inc., Birmingham, Ala., passed away recently.

STANLEY M. HANDS, chief testing engineer for the City of Oakland, Calif., died recently at his home after a short illness. He was at one time city engineer for Iowa City, Iowa, also sales engineer for the River Products Co., Iowa City, a crushed stone producer. Mr. Hands is an old friend and contributor of ROCK PRODUCTS.

CHARLES B. NIMS, sales manager of the Oregon Portland Cement Co., Portland, Ore., passed away December 4. He had been a resident of Portland for 27 years.

WILLIAM M. ANDREWS, past president of the National Crushed Stone Association, Washington, D. C., passed away suddenly on December 28. Mr. Andrews, who was associated with the Union Limestone Co., New Castle, Penn., served as president of the Association from 1942 to 1943.

William M. Andrews

GEORGE E. RICHMOND, retired president of the Richmond Stone Co., Houston, Texas, died recently at his home in Bellaire. He was 80 years old and had retired from active business about 10 years ago. Mr. Richmond was born in Magnolia, Wis.

FRANK E. TOWN, superintendent of the Manitowoc Portland Cement Co., Manitowoc, Wis., died suddenly December 2 at Cleveland, Ohio, where he had gone on business with officers of the Medusa Portland Cement Co. A graduate of the University of Michigan school of engineering, Mr. Town held executive positions with cement plants in Kansas and later at Dixon, Ill., going to Manitowoc in 1924 as superintendent of the plant. He took a keen interest in plant and public safety, was chairman of the Fox River Valley and Lake Shore Safety Conference in 1935 and again in 1942, and served on the city safety commission since its organization. He retired as president of the commission last year, although continuing on the group.

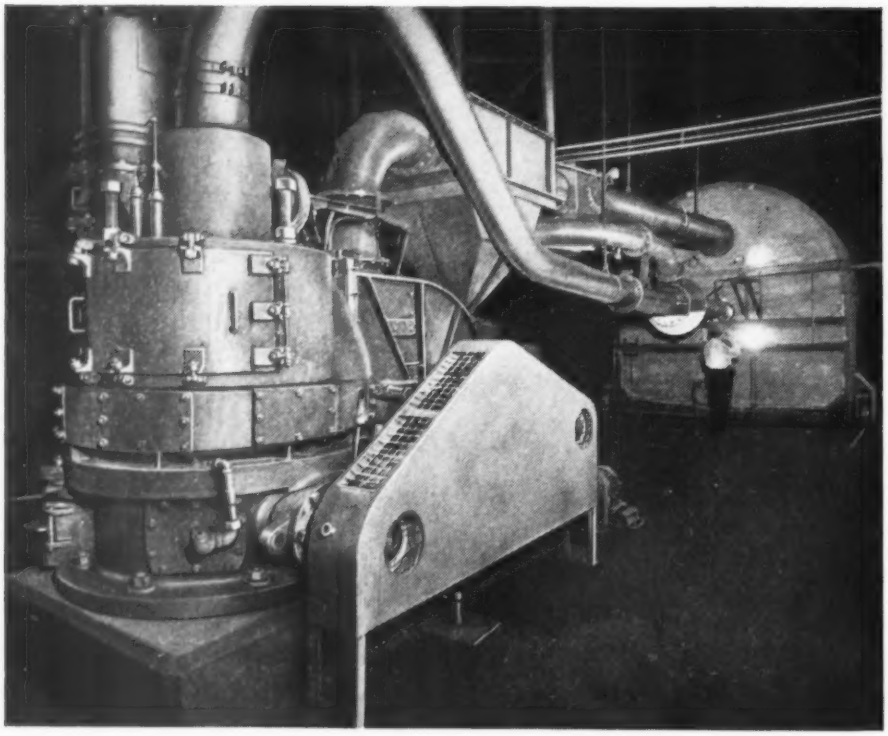
GEORGE A. CAMPBELL, treasurer of Superior Portland Cement, Inc., Concrete, Wash., died recently after a brief illness. He had lived in Concrete for the past 40 years and had been connected with the cement company there for most of that time.

JESSE L. SLATON, owner of the concrete block firm of Slaton & Sons, Kansas City, Mo., died recently following a short illness. He was 66 years old.

MAURICE HERTZ, retired owner of the Mt. Ephraim Sand Co., Belmawr, N. J., died recently following a long illness. He was 90 years of age.

GEORGE A. BREWER, president of the Longview-Saginaw Lime Works, Inc., Birmingham, Ala., passed away recently.

HIGH MOISTURE COALS



are no problem with the B&W direct firing system

• Coals containing up to 20 percent total moisture are being used successfully for firing rotary kilns with the B&W Direct-Firing System. Drying and grinding of the coal are accomplished simultaneously in this system. External drying facilities are unnecessary. During the pulverizing operation the coal is constantly in contact with moving hot primary air, and other partially ground and dried coal. As delivered to the burner pipes, the coal is not only properly pulverized but sufficiently dried to assure the flame temperature necessary for desired heat-transfer in the burning zone.

• This ability of the B&W Direct-Firing System to handle wet as well as dry coal is only one reason why it is helping so many cement plants to get higher kiln production at less cost and trouble.

FOR CEMENT PLANTS—Heat and Abrasion Resistant Alloy Castings . . . Stationary Boilers and Component Equipment . . . Waste-Heat Boilers . . . Fuel Burning Equipment . . . Pulverized-Coal Direct-Firing System . . . Pulverizers for Grinding Rock Products and Ores . . . Refractories . . . Seamless & Welded Tubes for All Pressure and Mechanical Applications.

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LABOR RELATIONS TRENDS

Court Decisions in Portal-to-Portal Cases

By NATHAN C. ROCKWOOD

RECENT announcement was made in Pittsburgh, Penn., that three C.I.O. unions are appealing to a U. S. Circuit Court of Appeals a District Court decision which denied their claims for overtime pay and penalties under conditions similar to the historic Mt. Clemens Pottery Co. case. These claims of the three unions in western Pennsylvania are reported to exceed $257,000,000. In all, about $5,000,000,000 in similar claims, some extending back as much as eight years, were presumably outlawed by the passage in May, 1947, of the Portal-to-Portal Pay Act. Since then there have been several District Court decisions which throw some light on how near the law will come to accomplishing its purpose.

It will be recalled that Congress was compelled to act because the United States Courts, including the Supreme Court, were stretching the language of the National Fair Labor Standards Act of 1938 to include all kinds of "preparation for work" activities never contemplated by employers as compensable work time. The purpose of the Portal-to-Portal Pay Act was therefore to clarify and amend the F.L.S.A. in line with its original intent, and to prevent the courts making any more radical interpretations. These amendments were designed to (1) relieve employers of liability under the F.L.S.A., the Walsh-Healey Act and the Davis-Bacon Act for payments in the past or future on account of employe activities which were not and are not currently included in work time by contract or by plant custom or practice; (2) put a limit of two years for filing of claim suits, except in states which have statutes of limitation of less than two years; (3) prohibit the courts from awarding liquidated damages or penalties in cases where the employer could prove he acted in good faith; (4) legalize both past and future compromise payments in settlement of claims; (5) ban "representative suits" brought by union officials, which in some instances were suspected as designed to benefit the unions or their officials rather than the individual employes.

Except for these revisions all the provisions of the F.L.S.A. still hold, and legitimate claims for back pay, up to the two-year limit, may of course be pressed. However, to prevent the courts from making any more damaging decisions the Act specifically provides that no court of law, federal or otherwise, shall have jurisdiction of any action or proceeding "whether instituted prior to or on or after the date of enactment of this Portal-to-Portal Pay Act, to enforce liability or impose punishment," etc., unless there is an express provision of a written or non-written contract in effect at the time of the alleged violation, or unless it was or is the custom or practice in effect at the time to pay for such overtime activities of employes."

One of the first issues to be decided is this one of the right of Congress to take both pending cases and future cases out of the jurisdiction of the courts where these requirements for a legitimate case are not met. The other point is that in the new Act, the Congress removed jurisdiction of the courts from pending cases where the suit was brought by union officials on their own initiative in behalf of a group of unnamed union members. The Portal-to-Portal Pay Act amended the Fair Labor Standards Act in this respect by providing that: "Action to recover such liability [that is, legitimate claims against the employer] may be maintained in any court of competent jurisdiction by any one or more employes for and in behalf of himself and themselves"—only if "he gives his consent in writing * * * and such consent is filed in the court in which such action is brought."

This provision permitted unions to reinstate complaints in cases brought prior to the enactment of the law by getting the written consent of the union members involved, or by some interpretations by naming them individually, in certain instances with little or no change in the original complaints. Hence, most of the cases considered by the courts since May, 1947, have been such suits, and motions by employers to dismiss these.

Act Is Constitutional?

It was natural for claimants, or their union representatives, at once to raise the issue of their "vested rights" being destroyed without due process. A typical instance came before the U. S. District Court, Southern District of Iowa, on motions brought by a group of employers to dismiss an action begun before the passage of the Portal-to-Portal Pay Act by their employes to recover alleged overtime pay based upon grounds similar to those in the Mt. Clemens Pottery Co. case. The judgment for dismissal was rendered September 25, 1947, by Judge Dewey. He said: "I am unable to agree that the Act deprives the plaintiffs of vested rights. Where Congress confers rights by statute it may take them away at any time, even where such rights have accrued and proceedings have been commenced to enforce them. * * * It follows that each of the actions enumerated * * * should be and they are hereby dismissed on the grounds that the court does not now have jurisdiction over the subject matter and for failure to state a claim upon which relief can be granted."

U. S. District Courts in southern California, western Missouri, western Pennsylvania, Maryland, northern Georgia, Connecticut, Kansas and western New York have made similar decisions. The case decided in the District Court, Western District of Missouri, is of special interest because the court gave the plaintiffs (the employes) time to amend their complaint to bring it within the requirements of the Portal-to-Portal Pay Act. Judge Reeves said: "The amended complaint as well as the original complaint shows that the claim is squarely within the case of Anderson et al vs. Mt. Clemens Pottery Co. * * *. In this [present] case the plaintiffs by their amended complaint placed themselves squarely within the doctrine announced in the Mt. Clemens Pottery Co. case. There is no pretext that the overtime suit was under an express provision of a contract or in accordance with a custom or practice in effect at the time of such activity. Since this is a requirement under the amended law for recovery, the Congress has taken away from the federal court jurisdiction where such averments are not made in the complaint."

In another case Judge Reeves dismissed a portal-to-portal pay suit in which the plaintiffs claimed that they were entitled to overtime pay for preparation time by their contract, one clause of which read: "Hours Worked — For the purpose of these regulations the term 'hours worked' shall include all time during which an employe is required by his employer to be on duty or to be on the employer's premises or to be at a prescribed work place. * * * 'Hours worked' will continue to be interpreted as at present, i.e., actual working time considered. * * * An employe is considered to be working if he is required to be on duty."

In summing up his conclusions the judge said in part: "The * * * question * * * is whether a contract or custom entitled the plaintiffs to assert a claim for overtime notwithstanding the provisions of the Portal-to-Portal Pay Act. Apparently very able counsel for the plaintiffs undertook to conform to the exceptions provided in the Portal-to-Portal Pay Act and set forth pertinent provisions of an express contract under which the plaintiffs engaged in their activities, and for which they claimed overtime compensation." The judge's decision hinged on interpretation of the sentence quoted: " 'Hours worked' will continue to be interpreted as at present, i.e., *actual working time considered.*" He concluded: "Other portions of the contract support the above [the conclusion that the activity of the employes was compensable only from whistle to whistle]. The contract quoted by the plaintiffs does not yield the interpre-

(Continued on page 97)

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INDUSTRY *news*

Leases Ilmenite Ore Lands in Florida

E. I. DU PONT, Wilmington, Del., has obtained a long term lease of ilmenite-bearing lands from the State of Florida, thereby ending the company's dependence upon foreign sources of the material. Detailed studies are already underway for the installation of equipment for large scale mining operations.

Ilmenite is the black ore from which white titanium pigments are manufactured by du Pont at its plants in Baltimore, Md., and Edge Moor, Del. Formerly the company's main source of titanium-yielding ilmenite ore had been Travancore in southwestern India, but increasing prices made a new source of supply necessary.

The biggest American source of titanium is the ilmenite ore in the Adirondack Mountains in New York State, where National Lead Co. mines between 200,000 tons and 250,000 tons of concentrate each year, yielding between 70,000 tons and 90,000 tons of titanium.

Cement Co. Consolidation

NEBRASKA CEMENT CO. and subsidiaries, with offices in Denver, Colo., and plant in Superior, Nebr., consolidated with the Ideal Cement Co., Denver, January 1. The three thousand bbl. Superior mill will continue to be run from the Omaha office, and will be known as the Nebraska Cement Division of the Ideal Cement Co. The Superior plant was the first erected in the State of Nebraska, and is now one of two, the second being at Louisville.

Idaho Phosphate Operation

J. R. SIMPLOT CO., Idaho fertilizer and food processing firm, has completed arrangements with Westvaco Chlorine Products Corp., New York, for erection of an electric furnace plant near Pocatello for production of elemental or metallic phosphorus. A 500 acre site has been purchased for the operation. A contract for engineering and construction has been let to United Engineers and Constructors, Philadelphia, Penn., according to J. R. Simplot, president.

This new plant is the result of experiments carried on over several years by Mr. Simplot and the Idaho Power Co., who will supply electricity for the furnace that is expected to be in operation by March of this year. Plans also call for the erection of a phosphoric acid plant for the manufacture of fertilizer. Phosphate rock will be quarried on the Fort Hall Indian Reservation at a point 23 miles from the projected plant.

Washington Jetty Project

KAISER CO., INC., Portland, Ore., has been awarded a $174,955 contract for repair of a jetty at the mouth of the Columbia river. The jetty will be used to protect a proposed channel connecting Illwaco, Wash., with the river. The contract requires placement of 30,480-cu. yd. of rip-rap, which will be quarried in Vail, Wash., hauled by rail to Longview, where it will be transferred to barges.

Glass Sand Production

PENNSYLVANIA GLASS SAND CORP., Lewistown, Penn., has recently acquired the properties of Mill Creek Sand Co., in Oklahoma, and is expanding facilities of the operation. The designed expansion of the plant is expected to add materially to the glass sand production of the district, which serves window glass plants in both Oklahoma and north Texas. Two large users of glass sand in this district will be the new plants of Corning Glass Works and American Window Glass Co.

New Canadian Portland Cement Plant

ATLANTIC CHEMICALS CO., LTD., has been organized for the purpose of developing plans for an industrial plant to be located on a 120-acre site on the Petitcodiac river, New Brunswick, for the manufacture of portland cement and sulphur dioxide. The process to be employed will involve the use of local anhydrite and shale.

The plant will have a single kiln with a capacity of approximately 1200 bbls. per day, and will have the usual ancillary quarries, crushing and grinding plants and facilities for storage and shipment. Officers of the new company are: F. W. Pirie, president; A. A. Scales, vice-president; H. J. Rowley, secretary-treasurer; and S. R. Frost, manager and director of engineering.

Stone Quarry Opened

NIAGARA STONE CO., Niagara, N. Y., has recently opened a quarry for the production of crushed stone for construction purposes. W. C. Olsker and N. H. McLain are partners in the new firm. Crushed stone from the new quarry has passed state specifications.

Buffalo Slag Sponsors Army Training Program

BUFFALO SLAG CO., INC., Buffalo, N. Y., recently signed an agreement with the U. S. Army, through Vice-President H. N. Snyder, to sponsor an engineering utility detachment. The affiliated training program is a voluntary plan by which civilian organizations and companies sponsor key service-type units for the Army Organized Reserve Corps. The essence of the program is to save training time in the event of future trouble.

In signing, Mr. Snyder afforded the engineers a reservoir of 375 employes from which to draw in forming the new unit. Also covered by the agreement are employes of Federal Portland Cement Co., Federal Crushed Stone Corp., and Hornell Gravel Corp., all of Buffalo and affiliates of the parent corporation. Mr. Snyder, at time of signing the agreement, stated: "We believe in preparedness. Industry practices preparedness in running its business and knows how essential it is when emergencies occur."

Cement Price Increase

ALPHA PORTLAND CEMENT CO., Easton, Penn., has announced price increases in all of its sales areas with the exception of Chicago. The price was raised 15¢ per bbl. in bulk in the Lehigh valley area and Philadelphia, making the total price $2.54.

Gypsum Company Expansion

NATIONAL GYPSUM CO., N. Y., is making plant and office additions in two states totaling approximately $425,000. The plant at Fort Dodge, Iowa, is undergoing an expansion program and the company is constructing a new plant and office building at Niles, Ohio, to serve as an addition to the existing plant.

Open Dolomite Quarry

AFTER A YEAR of preparation, Charles S. Munday has opened a dolomite quarry near Singers Glen, Va. The project, which represents an investment of approximately $100,000, has a capacity of 100 to 150 t.p.h. with the installation of a new unit.

A bulldozer pushes the dolomite into a hopper from which it is carried by a belt conveyor, 120-ft. centers, to the screens, and by another series of conveyors to storage bins.

Four sizes of the product can be screened simultaneously and conveyed to their respective bins in the storage house.

Freight Rate Increase

IN A UNANIMOUS decision the Interstate Commerce Commission granted a temporary freight rate increase of 20 per cent, or an additional 10 per cent over the 10 per cent authorized last October. The action came after long hearings on the plea by railroads for a 30 per cent increase. Present boost will be effective until June 30, 1948. It is estimated by the Commission that the temporary 20 per cent increase will yield $1,230,000,000 in additional revenue, provided rail traffic volume remains at 1947 levels.

Open Limestone Plant

COGDILL LIMESTONE CO., Fletcher, N. C., has taken a ten year lease on a limestone deposit of particularly hard, white stone. Using only a primary crusher, set for 1¼-in. opening, the company markets limestone dust and intermediate sizes up to 1¼-in. driveway stone. There is a demand in this locality for white limestone aggregate for use in concrete blocks. C. M. Cogdill states that the plant represents an investment of approximately $50,000.

Portland Cement Production

PORTLAND CEMENT production in September, 1947, as reported by the Bureau of Mines, was 17,319,000 bbls., or 5 per cent greater than that reported for September, 1946, the peak month of that year. Mill shipments reached 19,840,000 bbls. in September, 1947, a figure 16 per cent greater than that reported for September, 1946. Stocks of finished cement continued to decline and stood at 7,931,000 bbls. on September 30, a decrease 8 per cent below that reported for September 30, 1946. Production of 135,296,000 bbls. of cement in the first three quarters of 1947 represents an increase of 15 per cent over the output for the same period in 1946.

Percentage of capacity utilized in September, 1947, was 88 per cent, an increase of 5 per cent over that reported for September of 1946. Seventy-five per cent of capacity was utilized in the January-September period of 1947, an increase of 10 per cent over that reported for the same period of the previous year. The following statement gives the relation of production to capacity, and is compared with the estimated capacity at the close of September, 1947, and September, 1946.

RATIO (PER CENT) OF PRODUCTION TO CAPACITY

	Sept. 1947	Sept. 1946	Aug. 1947	July 1947	June 1947
The month	88.0	83.0	86.0	80.0	81.0
12 months	76.0	62.0	75.0	75.0	74.0

Coming Conventions

February 15-19, 1948—
Associated Equipment Distributors, Edgewater Beach Hotel, Chicago, Ill.

February 22-26, 1948—
National Association of Home Builders, Annual Convention and Exposition, Stevens and Congress Hotels, Chicago, Ill.

February 23-26, 1948—
American Concrete Institute, 44th Annual Convention, Shirley-Savoy Hotel, Denver, Colo.

February 26-28, 1948.
Sand-Lime Brick Association, Convention, Roanoke Hotel, Roanoke, Va.,

March 1-3, 1948—
National Concrete Masonry Association, Annual Meeting, Hotel New Yorker, New York, N. Y.

March 1-5, 1948—
American Society for Testing Materials, Committee Week and Spring Meeting, Washington, D. C.

March 11-13, 1948—
American Concrete Pipe Association, 40th Annual Convention, Hotel Roosevelt, New Orleans, La.

April 5-7, 1948—
National Lime Association, Operating Division, Gibson Hotel, Cincinnati, Ohio, January 29-30, 1948; Annual Convention, The Homestead, Hot Springs, Va.

June 21-25, 1948—
American Society for Testing Materials, Annual Meeting and Exhibit of Testing Apparatus and Related Equipment, Book - Cadillac Hotel, Detroit, Mich.

July 16-24, 1948—
American Road Builders' Association, Exposition of new Construction Equipment, Soldier Field, Chicago, Ill.

October 20-22, 1948—
National Industrial Sand Association, Annual Meeting, The Homestead, Hot Springs, Va., May 12-14, 1948; Semi-Annual Meeting, The Greenbrier, White Sulphur Springs, W. Va.

Making Limestone Products

KANSTONE CO., Garnett, Kan., a subsidiary of Garnet Rock Co., is erecting a concrete block building to house its new enterprise. It is expected to be ready for production by Spring, with limestone aggregate concrete blocks scheduled as the first venture. The company also plans to manufacture a lime dust for use on lawns and a grease absorbent for use in gas stations and garages. These last two will be marketed under the registered trade names of Garden Magic and Grease Monkey, developments of James Stevenson, manager and part owner of the new plant.

Permanente Safety Award

PERMANENTE CEMENT CO., Oakland, Calif., was recently awarded the top trophy in the large fleet section of the inter-city trucking contest sponsored by the San Francisco bay area chapter of the National Safety Council. The award was made by H. E. North, president, San Francisco Chapter, at a banquet held in San Francisco.

Fleet record of Permanente Cement Co., was 1,552,000 miles—equivalent of 62 times around the world—during the year with only 0.39 accidents per 100,000 miles. The trophy was received in behalf of the company by L. Flicker, safety - engineer; Ted Hoffman, dispatcher; Harry Smith, industrial relations; H. Milovich and J. Maynard, long haul drivers.

Diatomaceous Earth Plant

EAGLE-PICHER LEAD CO., Cincinnati, Ohio, recently completed a new diatomaceous earth plant at Clark, Nev., according to T. C. Carter, vice-president. The material will be processed for use as a filter aid, a carrier for fertilizers and insecticides, and a filler to provide low weight bulk and strength for plastics, paints, polishes and paper. The product may also be used in high-temperature insulation.

Open Rock Crushing Plant

THE RICHLAND LIME CO., Pulaski, Tenn., is starting a $90,000 limestone crushing operation at Decatur, Tenn. Both agricultural limestone and crushed stone will be manufactured at this new location. The 35-mile delivery radius from this plant will meet the area covered by an existing plant of the same company at Pulaski. All equipment at the Decatur plant is new, plus two buildings to house machinery and an office building.

Companies to Consolidate

PLANS FOR FORMATION of the Ohio River Sand Co., Inc., as a consolidation of Ohio River Sand Co. and its subsidiary, River Coal & Supply Co., have been announced to stockholders. If accepted, the new company will have outstanding 33,180 shares of new $20 par value 6 per cent convertible preferred stock and 33,600 shares of $10 par value common stock.

Kiln Improvement

IN ORDER to improve operations and thus reduce constantly increasing costs, Warner Co., Philadelphia, Penn., recently made several improvements on rotary kiln No. 3, Bellefonte. The kiln was supplied with an internal pre-heater, manufactured by the F. L. Smidth Co., which is installed in the feed end of the kiln and by preheating the stone more quickly, reduces the temperature of the stack gases. The lower half of the pre-heater is made of special high temperature alloy steel, which is further protected from high temperature by a special Warner arrangement of brick lining further down the kiln.

In addition, the kiln was provided with a F. L. Smidth cooler. The hood of the kiln was replaced with a smaller, close-fitting end shield, thus preventing cold air from leaking in. As a result of the improvements, the company expects to produce 60 additional tons of lime with the same amount of coal.

Stone Plant Receiver Upheld

RECEIVER for the Warren Stone Products Co., Springfield, Ohio, has been upheld by the Clark County Common Pleas Court in a petition to expend company monies in order to resume operation of the property. Harold and Marie Warren, owners, and the Miami Deposit Bank of Yellow Springs, creditor, concurred in the belief of the receiver, J. A. Mills, that the plant could be operated profitably.

Operate Sand Plant

N. C. CARROLL AND SONS gravel plant near Pratt, Kan., will be operated by O. K. Stewart and H. L. Allen. Mr. and Mrs. N. C. Carroll, owners, plan to move to St. Mary's, where they also own a ranch. Two additional plants owned by the firm, one in Wakeeney and the other in the eastern part of the state, will be operated by Gale and Lee Carroll, sons of N. C. Carroll.

Reorganize Lime Co.

MORCROP LIME CO., INC., has taken over the interest of the Silica Products Co. in the agricultural limestone operation near Arlington, Wash. Wes Johnson is in charge of production at the plant which is now manufacturing approximately 20 tons of flour-fine agricultural limestone per day.

Georgia Manganese Deposit

RECENT REPORTS on the Hale-Etowah mineral properties near Cartersville, Ga., reveal the manganese ore in that section to be considered the richest in the world, and early development of the properties has been announced by W. Roy Hale.

The reports state: "The Hale-Etowah property contains the richest and largest manganese deposits in Georgia. The Hale-Etowah manganese ore appears from assay reports to be the richest manganese ore in the world. The yellow ochre available on the Hale-Etowah property ranks as high as the first grade French yellow ochre."

Gypsum Production Increase

NATIONAL GYPSUM CO. expects a 25 per cent increase in production in 1948 as a result of its nearly completed $30,000,000 expansion program, according to Melvin H. Baker, president. The company's products are priced about 20 per cent above 1940 figures, despite a 90 per cent increase in labor costs, stated Mr. Baker.

Reclaim Sand

UTAH SAND AND GRAVEL Products Co., Salt Lake City, Utah, has opened a sand recovery plant at the site of a gravel pit in Evanston, Wyo. The pit has produced railroad ballast for several years for the Union Pacific Railroad Co., and the present plant will reclaim sand and crushed stone from waste material from the prior operation.

Concrete Masonry Convention

MEMBERS of the National Concrete Masonry Association will hold the 28th annual convention March 1-3 at the Hotel New Yorker in New York City. It will officially open at 10:00 a.m. Monday, March 1, with an address by the association president, HENRY E. BUCHHOLZ, after which reports of the treasurer, executive secretary and nominating committee will be heard. Five new directors will be elected at this time.

The remainder of the morning will be devoted to three discussions: "The Concrete Masonry Pictorial" by JOHN W. SHAVER, editor; "Concrete Masonry Units as a Structural Building Material in New York State" by E. M. FLEMING, manager, New York office, Portland Cement Association; and "Where Do we Go From Here?" by PAUL M. WOODWORTH, director of research, Waylite Co., Chicago, Ill. Announcement of the Thomas W. Noble Award by DEANE R. LYNDE, chairman, N.C.M.A. Board of Directors and chairman of the Noble Award Committee, will be made.

Monday afternoon's session will consist of a panel discussion on aggregates with HORACE W. BUSH, Multiplex Co., East Orange, N. J., as presiding officer. Discussion leaders, to be announced later, will summarize briefly the supply situation, new research data, and new developments concerning his type of aggregate.

Technical Problems

N.C.M.A. Technical Problems Committee will be heard Tuesday morning, featuring the following speakers: HAROLD PRATT, Barnes & Cone, Inc., Syracuse, N. Y., on "Overhead Conveyor System for Yarding and Loading Block Cubes"; JOHN P. SHEEHAN, The Atlas Lime Co., El Paso, Texas, on "Mechanical Unloading of Block Cubes from Trucks"; JACK CRABBS, Austin Crabbs, Inc., Davenport, Iowa, on "Increasing Plant Efficiency with Portable Turntables"; JAY C. EHLE, Cleveland Builders Supply Co., Cleveland, Ohio, on "Maintenance Practices with Hard Facing Welding and Chromium Plating"; and R. E. COPELAND, Director of Engineering, N.C.M.A., on "The Problem of Shrinkage Cracking."

Tuesday afternoon will be a technical session with JAY C. EHLE, chairman, N.C.M.A. Technical Problems Committee, presiding. Topics to be discussed are: "Today's Problems and Costs in Building Concrete Masonry Homes" by JOHN STRANDBERG, JR., Kansas City, Mo.; "Construction Requirements for Concrete Masonry" by LEONARD G. HAEGER, technical director, Housing & Home Finance Agency, Washington, D. C.; "Plant Safety—Industry's Opportunity and Responsibility" by IVAN LEGORE, assistant manager, Accident Prevention Bureau, Portland Cement Association, Chicago, Ill.; and "Should Our Industry Have a Safety Program?" by CLOYD B. FELLABAUM, chairman, N.C.M.A. Accident Prevention Committee.

A banquet and entertainment in the Grand Ball Room has been scheduled for Tuesday evening to be followed by a dance. Tuesday will also feature a sightseeing trip and luncheon for the ladies.

General session will be held Wednesday morning with the president-elect presiding. A report of progress in the training of apprentices in the building trades with special reference to bricklayer apprentices will be given by MAURICE M. HANSON, assistant director, Apprentice Training Service, Department of Labor, Washington, D. C. Other subjects to be covered include: "New Developments in the National Concrete Masonry Association Plan Service" by C. A. SIRRINE, Loree & Sirrine, architects, Ann Arbor, Mich.; "The Industry Engineered House and Modular Coordination of Building Materials" by A. GORDON LORIMER, consultant, "Producers' Council, Washington, D. C.; and "The Over-All Program of Producers' Council to Lower the Cost of Building and Improve Quality of Construction" by DAVID S. MILLER, president, Producers' Council, Washington, D. C.

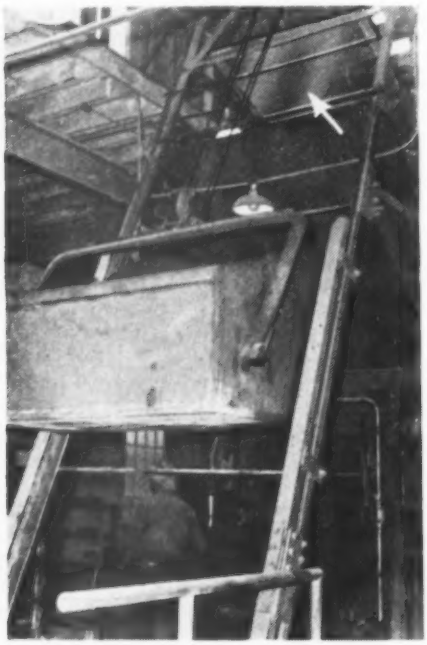
Convention activities will be brought to a close with an inspection trip through the plant of Plasticrete Corporation, Hamden, Conn., at 1:00 p.m. Wednesday.

HINTS and HELPS

PROFIT-MAKING IDEAS DEVELOPED BY OPERATING MEN

Mirror Over Hopper

GEO. W. KATTERJOHN CONCRETE PRODUCTS CO., Owensboro, Ky., has a mirror mounted over the block machine feed-hopper so that the mixer operator on the floor below can see when to elevate more concrete. This system has been installed over a Besser Super Vibrapac block machine with a 50-cu. ft. skip hoist elevating concrete from a 50-cu. ft. mixer below the floor level. This system eliminates a mezzanine floor to support the mixer over the block machine; or stationing a second man at this point.



Mirror over block machine feed-hopper provides constant gauge of contents so that mixer operator of below-floor-level mixer knows when to elevate additional concrete

Hydrating Magnesia

TAYLER ENGINEERING SERVICE, Detroit, Mich., has announced a new and continuous process for hydrating the magnesia in dolomitic quicklime. The process involves the use of a pressure vessel into which quick lime and water enters in continuous feed, and from which the finished lime discharges, dry, free from steam and air, ready for storage or bagging. High pressure results in high capacity from a small unit because magnesia hydrates at 125 p.s.i. in about one-third the time required at 25 p.s.i. A given size pressure vessel will handle three times as much output at the higher pressure.

Controls are said to be completely automatic, and provide for constant quality consistent only with the uniformity of the quick lime entering the process.

Silica Sand Drags

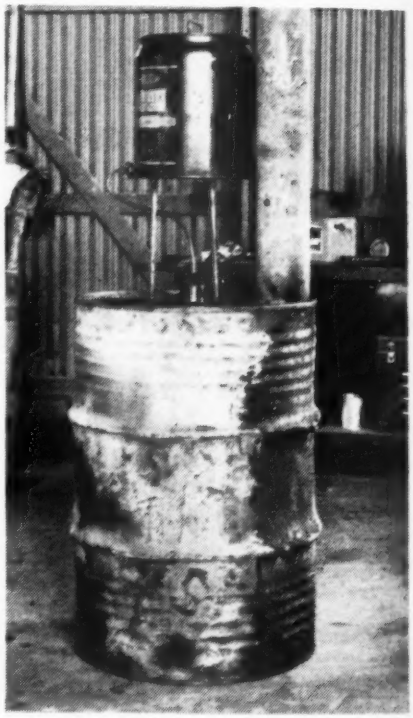
AT THE OLDER PLANT of the Nevada Silica Sands, Inc., near Overton, Nev., two drag classifiers are used in one of the final processing steps. The rakes on these classifiers instead of being the conventional angle iron bolted to the belt are here made of hardwood. They are about 2- x 4-in. in cross section, and have proven quite serviceable and eliminate the small amount of iron that might be introduced by using metal rakes.

The company is now placing in operation a new silica processing plant which is modern in every respect which will have a Dorr hydroseparator and a Dorrco sand sizer. The new plant will use 10 Wilfley tables to reduce the iron content of its products from .04 per cent to .03 per cent. The company has been in operation at this site for over ten years and ships into the Los Angeles and other California areas.

Silica sand drag with hardwood rakes instead of angle iron rakes

Heater to Dispose Of Waste Oil

AT a Western sand and gravel plant, a repair shop is provided to maintain the fleet of 11 trucks. As this plant is in the heart of the orange growing section of California, no heat should be necessary. However, a heating stove had been set up, using an oil barrel, stack, just like those seen in the cold, cold East. It was explained that it was used to burn up the waste oils from the trucks, and the heat was just incidental.



Heating stove, made from discarded materials, used to dispose of waste oil

The heating stove comprised an old discarded grease can for oil storage mounted on top of the barrel. Oil flowed by gravity through a suitable pet cock to a 3-in. diameter steel pipe where it is dropped into the fire zone below. The 3-in. pipe provided the necessary air for combustion.

Drilling Platform

AT THE QUARRY of Cook & Co., Inc., near Portland, Me., heavy blasting cannot be done due to the proximity

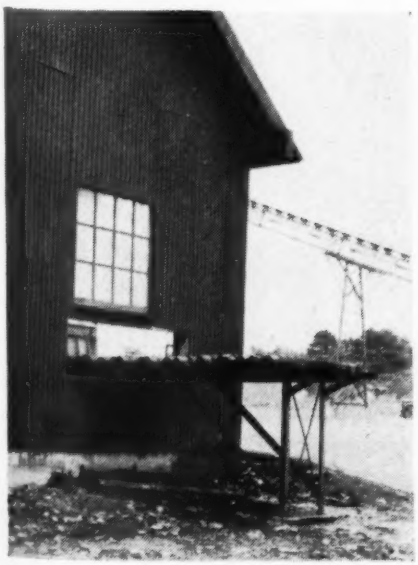
Section of steel scaffolding used as improvised platform in drilling face of quarry

of the quarry to the highway. Consequently, considerable drilling is done with jackhammers with the men working in some cases, well above the quarry floor.

To make it possible to drill some of the higher benches of rock, a part of a building contractor's scaffold support is laid against the quarry face and the drill operator uses this for both a ladder and for an improvised platform from which to drill.

Steel Rack for Drill Bits

THE JOHN IAFOLLA CRUSHED STONE PRODUCTS CO. has a modern crushed stone plant near Portsmouth, N. H. One of the interesting features of the new plant is a well-equipped drill steel



Steel rack to roll drill bits into blacksmith shop

sharpening shop. A total of 50 drill bits are used, and when they become dull a truck hauls them to the shop where they are placed on the steel rack shown in the illustration. The heavy bits on the rack can be rolled inside the shop whenever the blacksmith desires, without any undue effort. Little labor saving stunts like this have resulted in a relatively large tonnage per day with a comparatively small labor cost.

Large Capacity Car Loader

T. L. HERBERT & SONS' Sangravl Plant No. 1, Johnsonville, Tenn., has constructed a car-loader capable of loading cars on tracks on opposite sides of the plant and with a rated capacity of 820 t.p.h. Essentially, this car-loader is a 36-in. moveable belt conveyor on 30 ft. centers, powered by a 15 hp. motor mounted over the discharge end of the belt. A shield de-

Swing car-loader, with deflection shield, A, at discharge end of belt, C, powered by motor, B

flects material discharged from the belt downwards to the cars.

Pivoted at the end directly below the discharge point of the plant conveyor, and from which it receives material to be loaded, a raised semi-circular track about 8-ft. out from the pivot provides a runway for the carriage that acts as a fulcrum to support the extended overhang of the loader. Weightometer records continuous weights of materials in transit to the loader.

Sheave with Demountable Rim

AT one of the Henry J. Kaiser Co., Inc., gravel plants, Frank Heffernan, general superintendent, has developed a sheave with a demountable rim which cuts replacement cost and increases wire rope life. Three slackline cableway excavators with 2½-cu. yd. buckets have 750 ft. of main line cable with IPS hemp center, 1-in. preformed wire rope. The haul back lines are 1600 ft. ⅝-in., hemp center preformed.

Frank Heffernan displaying his sheave with demountable rim

A 14-in. sheave is used 20 ft. out from the drum. With the conventional sheave it was necessary to repair and build up grooves or replace sheaves at least once a month. The main line, even when the longer lasting preformed rope was used, gave only about one half the life which should have been obtained. Added to this extra rope and sheave replacement expense was the loss from shutdowns.

It was this experience which led to the perfection of a sheave with a demountable rim and groove which can be replaced in 5 min. time. In making this new type sheave, the groove section of the conventional 14-in. sheave was cut off and placed on a demountable rim. With six ½-in. bolts and lock washers on centers, the groove of the sheave can easily be changed without replacing the entire sheave.

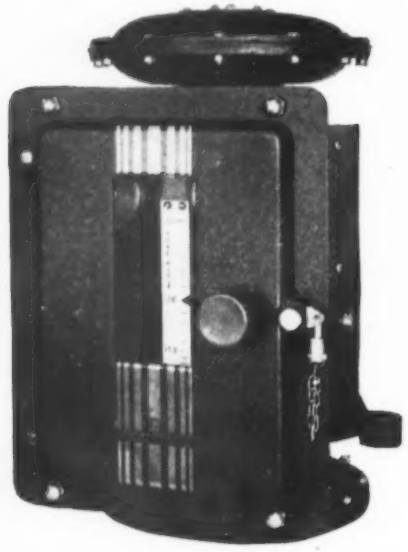
To correct heavy wear due to the action of the sand on the rope passing through the groove, the groove section was cast from medium hardness manganese. A pattern was made at the company shops and the grooves and rims were cast in a local foundry. The demountable rim and groove costs $9 as against a $45 replacement cost on a new sheave, but the biggest saving is in longer rope life. With the conventional type of sheave and groove, the main line rope was retired after each 60 days of operation but with the new sheave ropes have averaged 140 days of life. The life of the manganese steel groove section is ten times that of the conventional type.

As preformed wire rope is used, the retired cable has no flares at wire breaks, permitting its use as a safe utility rope.

NEW MACHINERY

Air-Fuel Ratio Controller

LEEDS & NORTHRUP Co., Philadelphia, Penn., now has in production a new air-fuel ratio controller which employs electric-motored valve drives.



Air-fuel ratio controller employing electric-motored valve drives

According to L&N, the new controller needs no hydraulic piping; is a rugged, balance-type instrument, and has ample flexibility to meet all operating conditions. The instrument is so designed that its ratio can be adjusted manually for operation with fuels of various B.t.u. content, and as fuel flow changes, the controller maintains air-fuel ratio constant at the desired control point. The device can also provide variations of ratio, increasing or decreasing the percent of air at reduced fuel flows.

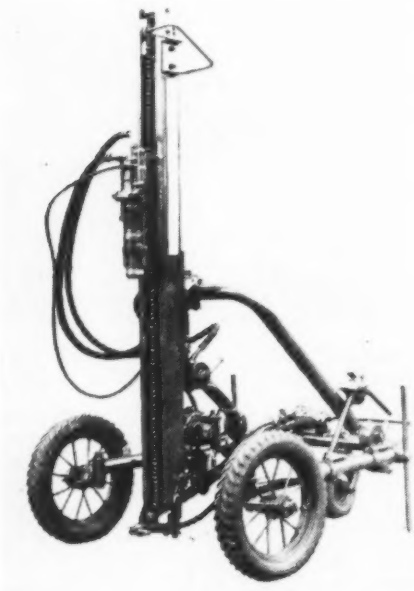
Hard-Facing Rod

WALL COLMONOY CORPORATION, Detroit, Mich., is now in production on a plastic bonded rod in 5-lb. coils. It is supplied in 18-in. and 3/16-in. diameters which makes it possible to execute the Colmonoy Sprayweld process, using wire metallizing equipment which will handle wires of these diameters.

This plastic bonded rod is composed of powdered Colmonoy No. 6, combined with a plastic binder. As this rod passes through the flame of the metallizing gun, the plastic burns out, leaving the Colmonoy particles to deposit on the surface being sprayed. After the desired amount of overlay has been applied (a minimum of .010-in. to a maximum of .125-in.), it is bonded to the base metal by means of large oxy-acetylene torch, induction equipment or a controlled atmosphere furnace. With any of these methods, the manufacturer states the final result is a molecular bond between the Colmonoy and the base metal identical to that obtained with the same alloy if applied in rod form.

Motor-Feed Wagon Drill

GARDNER-DENVER Co., Quincy, Ill., has designed a wagon drill, Model URM, having a three-wheel universal mounting with a motor feed for 6-ft. steel changes. The motor feed is operated by a 5-cyl. radial air motor of Gardner-Denver design, driving a chain attached to a heavy mounting slide carrying the drill. This model



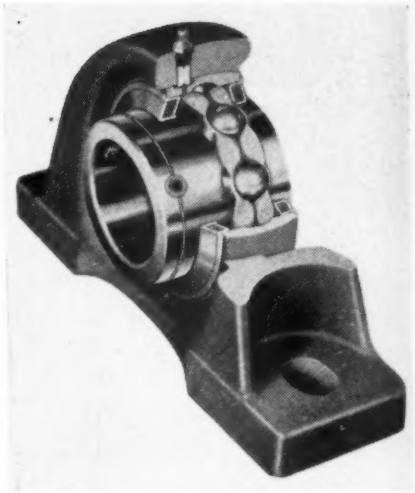
Wagon drill with air motor feed

carries a 3½- or 4-in. bore Gardner-Denver derrick drill.

A number of advantages are claimed for this new model: the feed can be reversed instantly for effective churning; the correct feed pressure is maintained by means of a regulating valve operated by a cam on the feed control handle; a single throttle handle controls drill operations; and faster hole-cleaning is assured by an air-actuated exhaust control valve operated by the drill throttle handle.

Ball Bearing Pillow Block

STEPHENS-ADAMSON MFG. Co., Aurora, Ill., has improved its Sealmaster ball bearing pillow block with a ball



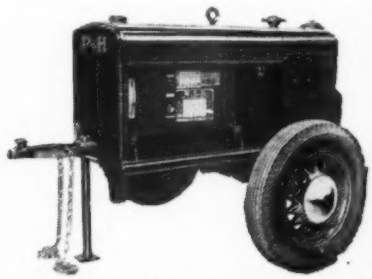
Pillow block with improved lubricating feature

retainer that spaces the balls the same as the original retainer. In addition, it has the property of keeping the lubricant around the balls, thus helping to minimize the loss of lubricant.

Portable Welder

HARNISCHFEGER CORPORATION, Milwaukee, Wis., has designed a self-powered arc welder for shop, yard, and field service. Known as the P&H Model WN-200 welder, it is available as a stationary or trailer unit. It has an N.E.M.A. rating of 200 amp., but has a welding service range of from 30 to 260 amp., according to the manufacturer. Both types have engine and welder securely mounted on an all-welded frame of steel tubing and heavy angle iron. Both models are equipped with the company's square frame arc welding generators with one control for any desired welding heat from minimum to maximum capacity.

A heavy-duty, 4-cyl. air-cooled engine of 26.5 hp. supplies power for



Trailer model welder for use in the field has standard pneumatic tires

both models. A 5-strand "V" belt is used for power transmission.

Heavy Duty Trucks

DODGE DIVISION, Chrysler Corporation, Detroit, Mich., has brought out a new line of trucks comprising 248 basic chassis models, ranging from 4250 to 23,000 lbs. gross vehicle weight and up to 40,000 lbs. gross train

Truck of 2½-ton capacity with G.T.W. rating of 34,000 lbs.

weight, according to an announcement by L. F. Van Nortwick, director of sales.

In these truck designs, the front axles have been moved back and engines have been moved forward to place more of the gross vehicle weight on the front axle and provide better weight distribution. The wheelbase for conventional models through the 2-ton has been reduced 8 in., while the 2½- and 3-ton models have been reduced 6 in.

Shorter wheelbases and wider tread front axles, together with cross steering, are features on all conventional cab models.

Large Haulage Unit

R. G. LETOURNEAU, INC., Longview, Texas, has introduced to industry what has been termed, the Tournahauler. It is a heavy-duty, electrically-powered unit equipped with a Tournamatic differential which causes the drive wheel having the greatest traction to pull several times harder than the other. Heavy-duty tires operating with lower air pressure are used.

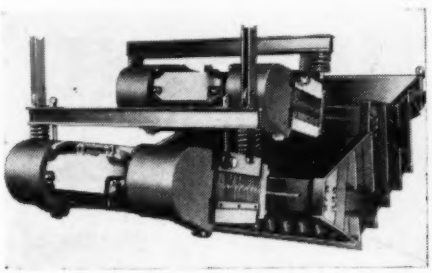
Positive steering power is controlled by means of small micro-switches on the dash board, permitting the operator, with a single flip of the finger, to guide the rig in any desired direction. The two-wheeled prime mover is Diesel-powered with an electric starter. It is equipped with multiple-disc, air-actuated brakes. A 50 kv.a. in-line generator, driven off the engine, supplies current to an electric motor. As shown in the illustration, the unit seems to offer possibilities in hauling large concrete pipe or to transport and unload concrete block or sacked cement on pallets.

Lubricating Grease

KNAPP MILLS, INC., New York, N. Y., has announced the production of a lubricating grease, known as Lead-Lube, which is said to be especially effective on all open gears and bearings. The product is a mixture of extremely fine metallic lead powder, and high grade lubricating grease. The manufacturer states that after a period of use, this lubricant will form a coating of metallic lead over all gear and bearing surfaces, cutting down additional grease requirements. It also is said to cut down shock and noise, and reduce wear.

Vibratory Grizzly Feeder

SYNTRON CO., Homer City, Penn., has developed its F-55 double-magnet, heavy-duty electric vibratory grizzly feeder for large capacity separation



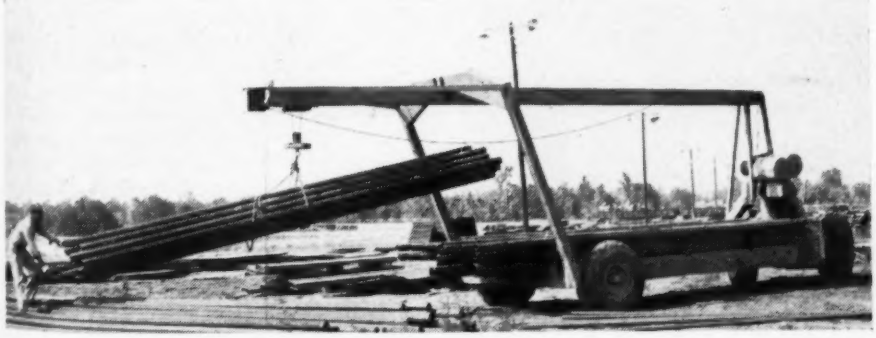
Vibratory grizzly feeder in which magnets may be mounted above the deck or below

of crusher feeds. These grizzlies are available in different sizes and types, either single or double magnet, with the magnets mounted above the deck or below, all featuring the variable control of the rate of feed and with either full or partial grizzly decks.

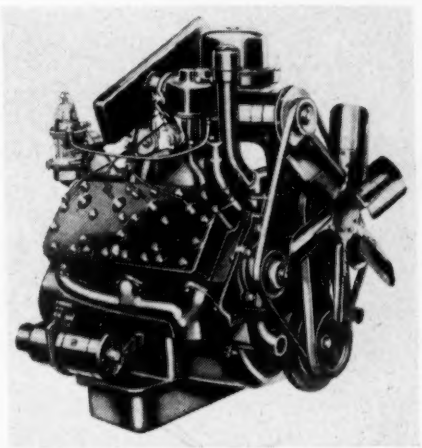
Operation is from 220-volt, or 440-volt a.c. The small models, the F-1, F-21, and F-22 can also be operated from 110-volt a.c.

Three New Truck Engines

FORD MOTOR CO., Dearborn, Mich., announced three new engines for its 1948 line of trucks now on display. These engines are the Rouge 226, a



Large haulage unit provided with means to load and unload long, heavy objects



Engine develops 145 hp., and 255 lb. ft. torque

completely new six-cylinder, 95-hp. truck engine; the Rouge 239, an improved V-8 100-hp. engine; and the Rouge 337, a new heavy-duty V-8 power plant developing more than 145 hp. for the largest trucks built by this company.

All engines have heavy-duty oil bath air cleaners, pressure-sealed cooling systems, and weather-proofed ignition systems with automatic spark control which is regulated by engine load and speed. New distributors and wiring, conveniently located; valve seat inserts of hard molybdenum chrome alloy, and oversize crankshafts, and higher capacity generators are other points of interest.

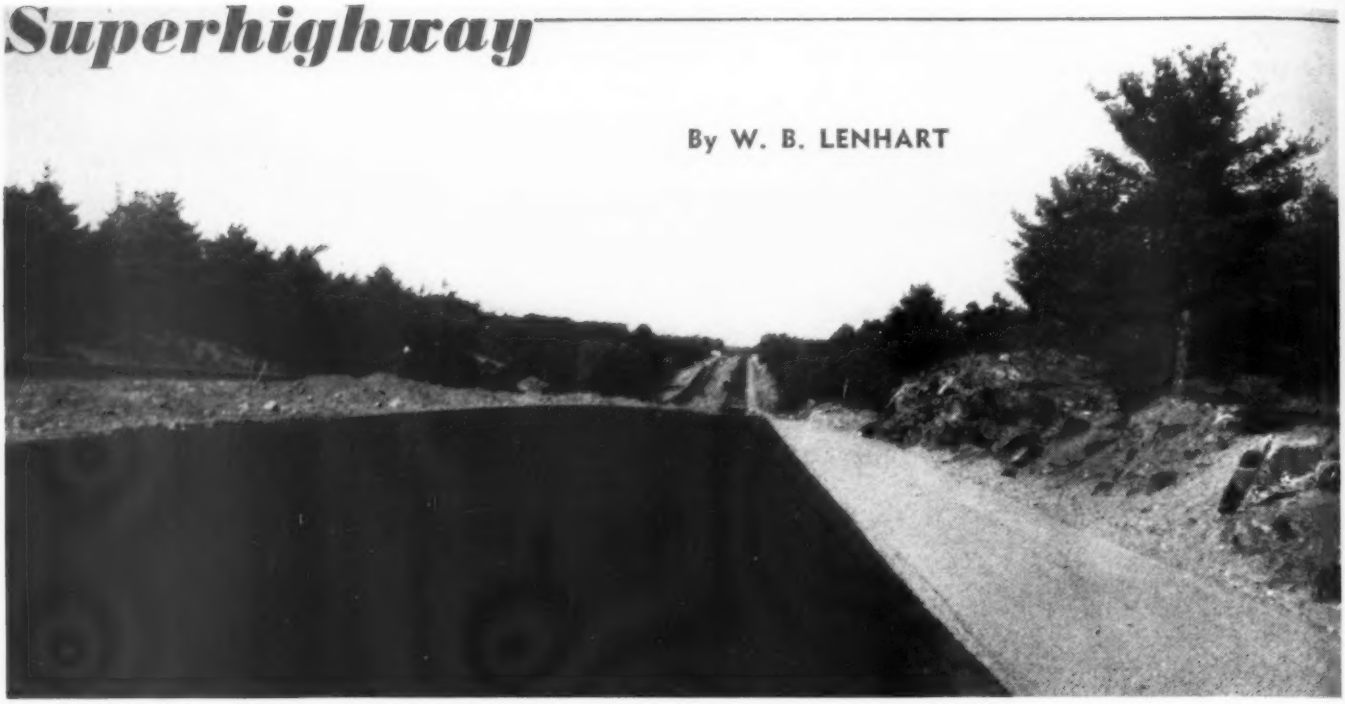
The six-cylinder engine has aluminum alloy pistons which are longer and plated to resist wear. The 100-hp. engine has accessories conveniently grouped on top for easy servicing. The 145-hp. power plant features hydraulic valve lifters which automatically compensate for valve wear and insure quiet operation; silichrome exhaust valves faced with a tough metal; and a governor built into the carburetor and operating from engine speed and vacuum. Clutches on the larger trucks are 12 in. in diameter, capable of easily handling the peak torque output of the 145-hp. engine. These trucks also have five-speed transmissions. The F-7, with maximum gross vehicle weight of 19,000 lbs., has a single speed, heavy-duty hypoid axle; the F-8, with a gross vehicle weight of 21,500 lbs., has a two-speed axle, making 10 speeds available for all types of roads and loads.

Two New Truck Tires

THE B. F. GOODRICH CO., Akron, Ohio, is now in production of two new sizes of truck tires; namely, the 7.50-20 ten-ply Universal, and the 14.00-24 twenty-ply Rock Quarry casing. The Universal is designed for quarry and gravel pits as well as for haulage units in underground mines. The Rock Quarry casing was developed for quarry operators and various mining uses.

Superhighway

By W. B. LENHART



Looking down one of the partially completed sections. Note two lanes of black top highway with separation strip and crushed stone or gravel shoulder

MAINE TURNPIKE PROJECT

Largest highway job in 1947

Four portables and one permanent plant supply about 600,000 tons of blacktop and concrete aggregates for $20,000,000 project

EVER since the construction of the Pennsylvania Turnpike in the late thirties many states have turned to super-highways as one solution of their traffic problems. A major factor in this problem is financing. Super-highways with toll charges, covering maintenance costs and amortization, appear to offer an easy solution to this problem. Besides the Pennsylvania Turnpike, with its 161 miles of high speed, four lane highways, other toll-financed highways include: Merritt Parkway in Connecticut; and the Hutchison River Parkway, Saw Mill River Parkway, Fleetwood Viaduct and some 18 different parkways, bridges and tunnels, all in New York. From these highway ventures have stemmed a veritable epidemic of super highway proposals based on toll earning features. Ohio, Oklahoma, Connecticut, Arkansas, West Virginia, Georgia, Maryland, Massachusetts, Pennsylvania, Washington, and New Hampshire all have toll-financed super-highway programs either pending or passed, or discussed seriously. Even in California some sections of the populace are in favor of this type of highway financing.

Dumping stone into hopper feeding primary crusher of Cedarapids portable plant operated by B. Perini & Sons, Inc.

Following in the footpath of these toll-financed highways, the State of Maine created a Turnpike Authority in 1941 with authority to sell bonds to span the state. World War II held up the project but the bonds to finance construction of a super-highway were sold in February, 1946, and work started immediately. The first 45 mile section of this highway is now nearing completion and will be carrying some traffic by the time this goes to press. The super-highway starts at a point close to the New Hampshire border (Kittery, Me.) and extends to the suburbs of Portland, Me. The project represents an investment of about $20,000,000. Tolls will be on a basis similar to the Pennsylvania Turnpike with approximately one cent per mile for passenger cars.

Over-all view of B. Perini & Sons, Inc., Cedarapids sand and gravel plant

Biggest Contract Ever Let

In a swing through the Eastern and New England States the author was surprised at the great amount of interest expressed in this highway by aggregate producers in the area. This interest springs from a number of reasons, among which might be mentioned that it is an all-asphaltic concrete paving job, involving the placing of 520,000 tons of bituminous concrete or 1,360,000 sq. yd., making it the largest single highway paving job of this type to be let. The paving contracts alone amount to $5,600,000. A possible second point of interest is that all the aggregates for this vast project are being produced by the primary contractors and sub-contractors in four portable aggregate plants (three sand and gravel and one crushed stone) and at each aggregate plant or close by is an asphalt plant. Some crushed stone for the surface course was purchased from a nearby commercial operation and part of the ready mixed concrete in the piers for the 43 bridges and overpasses, and for concrete used in the three intermediate entries and the two ends.

Introduction of four portable aggregate plants into the area worked no hardships on any of the local established producers for they had more business of their own than they could handle. In the more sparsely settled states the use of portable plants is no particular novelty but here on a high tonnage and on a high speed construction project, their use aroused no little interest.

Construction Features

The Maine Turnpike is a four-lane, divided highway with each roadway 24 ft. wide. The grass media strip is 18 ft. wide, and the two 24-ft. roadways have 4 ft. inside and 8 ft. outside treated gravel shoulders. The sub-grade is a prepared, non-frost A-3 type; i.e., of sand and gravel of suitable drainage properties to provide good sub-drainage.

Fortunately for the builders of this super-highway most of the soils in the area are suitable "as is" as they are of glacial sand and gravel. Where clays are encountered, the sub-grade was cut to 18 in. to 36 in. below grade, and a suitable fill hauled in and compacted. On the outside of each roadway a ditch of a minimum depth of five feet has been provided for drainage.

On the prepared grade, a base course of 2¾-in. of asphaltic concrete is placed and after compacting gives a base course 2½-in. thick. Where the soil is high in sand, this base course is 3-in. after compaction. On top of this is placed a second course of bituminous concrete of similar thickness, and the final or top course of 2-in., giving a final thickness of 7- to 8-in. For the bottom course, specifications call for either crushed stone or gravel that will have a percentage of wear not greater than 10 per cent after 100 revolutions or 40 per cent after 500 revolutions as per the Los Angeles Abrasion Test. All gravel for the base and middle course must pass a 1½-in. opening. On this job gravel is being used almost exclusively for the two bottom courses.

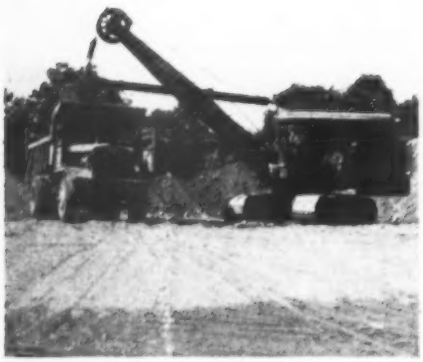
Work progressed at high speed with some 6500 tons of aggregate used per day with 30,000 tons per week being about average.

For the surface course, minus ½-in. crushed stone is used, most of which was produced by the prime contractor, B. Perini & Sons, Inc., Framingham, Mass. The surface material must have a percentage of wear not more than 25 per cent as determined by the L. A. Abrasion Test. Stone taken from a quarry opened up at the southerly end of the highway has a percentage of wear in the 10 to 17 per cent range and therefore is well within specification requirements. At the north end, some crushed stone for the surface course was purchased from the Blue Rock Quarry, near Westbrook, Me.

The asphalt cement specifications called for a non-foaming (at 350 deg. F.) petroleum product with the following properties:

Close-up of dual portable screening and crushing plant

Delivering black top mix to paving machine which is placing the base course



Loading haulage unit for transportation to B. Perini & Sons, Inc., sand and gravel plant

Wagon drill in operation at B. Perini & Sons, Inc., crushed stone plant

Penetration of original sample at 77 deg. F., 100g, 5 sec. 85 to 100.

Flash Point, Open Cup not less than 450 deg. F.

Loss on Heating at 325 deg. F., 5 hrs., per cent not more than 1.

Penetration after loss on heating percentage of original not less than 70.

Ductility at 77 deg. F., not less than 100.

Solubility in Carbon Tetrachloride, percentage, not less than 99.5.

Gradation of the coarse aggregates had to meet the following requirements:

Total Passing	Per Cent by Weight Mix No. 1	Mix No. 2
2½-in. sieve	100	
2-in.	95-100	
1-in.	35-70	100
¾-in.		90-100
½-in.	10-30	
⅜-in.		20-55
No. 4	0-15	0-15
No. 10	0-5	0-5

In the preparation of the paving mix, material passing the No. 10 sieve and retained on the 200 was classed as sand or fine aggregate. Material passing the 200 sieve was referred to as mineral filler.

The fine aggregates could consist of sand or stone screenings or mixtures of the two with the following screen size requirements:

Passing	Retained On	Per Cent by Weight
No. 4 sieve		98-100
No. 4	No. 10 sieve	0-15
No. 10	No. 40	15-50
No. 40	No. 80	30-60
No. 80	No. 200	15-40
No. 200		0-5

The general composition of the paving mixes used had the following general characteristics:

MINERAL AGGREGATE COMBINATION

Constituent	Passing Sieve	Retained On Sieve	Per Cent by Wt. Mix No. 1	Per Cent by Wt. Mix No. 2
Coarse Aggregates	2-in.	1-in.	15-45	
	1-in.	½-in.	3-45	
	¾-in.	⅜-in.		18-50
	⅜-in.	No. 4		3-36
	No. 4	No. 10	5-15	9-22
Sub-Total		No. 10	60-80	50-65
Fine Aggregate Filler	No. 10	No. 40	3-19	5-22
	No. 40	No. 80	5-22	9-27
	No. 80	No. 200	3-15	5-18
	No. 200		0-5	5-8
Sub-Total			20-40	35-50
Total Mineral Matter			100	100

TOTAL MIX

Total Mineral Aggregate	93.5-95.5	92.0-94.0
Asphalt Cement (Bitumen)	4.5-6.5	6.0-8.0
Total Mix	100	100

Tolerances from 5 to 2 per cent from the job mix formula were allowed with the larger tolerance being in the larger sizes. For the bitumen, tolerance was 0.3.

Asphaltic concrete as prepared in the plants was delivered to the job in trucks with tarpaulins protecting the load. The asphalt was spread at 250 to 275 deg. F. at a rate of 10 ft. per minute. On the south end where B. Perini & Sons, Inc., were working at time of inspection, two Barber-Greene paving machines were working in parallel lanes. Each machine lays a 12-ft. swath for the first base course, and on the second base course, 11- and 13-ft. widths were laid with alternating widths at intervals to eliminate vertical center joints. The machines placed the asphaltic concrete at about 10 ft. per minute. The asphalt material was compacted with 12-ton rollers in seven passes. After cooling to hand temperatures the mass was consolidated to 95 per cent of laboratory density and to remove roller marks. In practice, one to two days would be spent on the base course, then the second layer put down, keeping the base road work well ahead of the finish. The contractor's crew laid 2100 or 17,500 sq. yds. of 2½-in. asphaltic concrete in one day.

B. Perini and Sons, Inc., had the primary contract for the paving and sub-let approximately the northern half to Gibbons and Reed of Salt Lake City, Utah. Howard-Needles-Tammen and Bergendoff of New York City and Kansas City, Mo., are the consulting engineers. William B. Getchell, Jr., is the executive director for the Maine Turnpike Authority with offices in Kennebunk, Me. The consulting engineers also have offices at Kennebunk with L. D. Brown, project engineer, in charge. Lucius D. Barrows is chief engineer for the Maine State Highway Commission with offices in Augusta, Me. Stewart Associates, Inc., were retained as consultants and had all laboratory and inspection work under their control. Fred Crabtree represented this company in the field paving.

Open Credit Department

MARQUETTE CEMENT MFG. CO., Memphis, Tenn., has announced the opening of a credit department at its sales offices to be headed by William C. Anderson, former assistant credit manager of the company's Chicago headquarters.

PORTABLE PLANTS SUPPLY AGGREGATES

TWO AGGREGATE PLANTS are operated by B. Perini and Sons, Inc., the primary paving contractor on the Maine Turnpike. One produces sand and gravel for the base courses and the other crushed stone for the top course. The sand and gravel plant, located near Wells, Me., on Route 9B (Littlefield road), is a Cedarapids unit and turns out about 200 cu. yd. per hour of screened but unwashed material. Usually one or two men attend to plant operation except for an extra or two needed intermittently at the primary grizzly. This plant is made up of two units, all on rubber. The first unit, driven by a D8800 Caterpillar Diesel, runs the 12- x 30-in. primary crusher and scalper as well as related conveyors. The scalper has three decks, the top mesh is 2-in., the middle, ½-in., and the lower deck, ¼-in. The middle deck acts only to relieve the lower deck from excess loads. The fines fall to a 24-in. cross belt, moving material to small bin storage and from thence to ground storage via the Euclid trucks. The large oversize is fed to the jaw crusher and the plus sizes from the bottom and middle deck fall to a 36-in. inclined belt serving the second unit. The crusher discharges to this same belt.

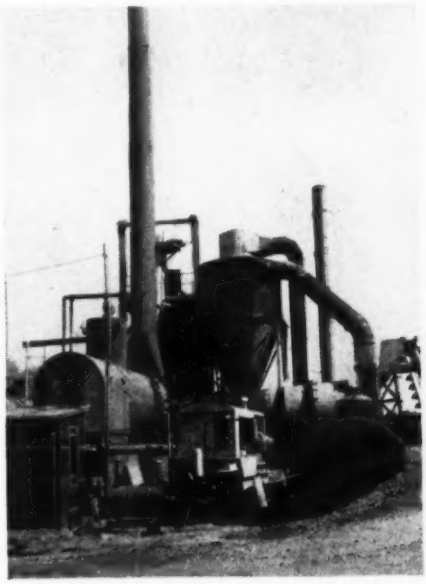
The second unit, driven by a Murphy Diesel, consists of the final screen and a set of 24- x 40-in. rolls and related conveyors. The primary screen has a single deck with 1½-in. mesh. Throughs falling to a 36-in. cross belt are conveyed to two steel storage bins from which the final product is trucked to ground storage or to the asphalt plant nearby. Oversize from the 1½-in. screen falls to the rolls and then to a return belt that discharges to a "lifter wheel" which deposits the crushed gravel onto the belt serving the final screen. The circulating load is extremely heavy but the plant functions smoothly without any trouble or delays.

The pit material from a 10-ft. bank of glacial sand and gravel is hauled about 1000 ft. in a fleet of 15-ton, high dump angle, Euclid trucks. The rear wheel and chute assembly of these trucks facilitates dumping over a bank, into a hopper, or on a fill.

Diesel driving primary unit of Cedarapids sand and gravel plant operated by B. Perini & Sons

Hot Plant for Base Courses

Located close to the sand and gravel operation is the B. Perini and Sons, Inc., bituminous concrete plant for the base courses. It consists of two Barber-Greene plants operated in tandem and discharging the finished material to the same receiving box. The aggregates are delivered to the plant and dumped near the two, 2-compartment steel charging bins; one bin for each plant. Material is delivered to the charging bins by a 2½-cu. yd. Northwest clam shell. The two sizes of material used for the base course (sand-gravel) are all fed to the "cold" elevator by a single, two-compartment reciprocating feeder with two quadrant gates controlling the amount of flow. The cold elevator delivers material to the oil-fired rotary dryer which is served by the hot elevator. The dryer is driven by an International gasoline engine through a universal joint and shaft. The dryer elevator delivers to a sizing screen mounted over the 4-compartment hot storage bins. Hot bitumen is metered to the twin pug that discharges to the "gob," or receiving box, under which trucks drive for loads. The plant was a busy scene and turned out in excess of 200 cu. yds. of material per hour. Dust from the dryer is drawn to cyclone dust collectors via a Claridge fan.



Black top plant of B. Perini & Sons, Inc., which prepares top course material from crushed stone plant. Diesel-electric unit drives dryer

As aggregates in the ground storage pile are scattered somewhat, an International TD-14 tractor equipped with a Bucyrus-Erie dozer pushes the aggregates within reach of the 2½-cu. yd. Northwest clam shell.

Crushed Stone

CRUSHED STONE for the top course comes principally from a plant about three miles south of the sand and gravel plant operated by B. Perini and Sons, Inc. This company also operates the quarry and crushing plant.

When the quarry was first opened, the crushed stone passed specifications, but it was soon learned that the rock immediately under the surface was much harder and better for the wearing course. Specifications for the wearing course required not over 25 per cent wear as determined by the Los Angeles rattler test, but this stone easily tested below 17 per cent with lows sometimes in the 10 per cent range. While most of this rock was used on the south half of the job, some of it, owing to its excellence, was trucked to the north half and used by Gibbons and Reed on this section of the contract. There is a considerable variation in the hardness of the stone taking the face as a whole. As an illustration of this condition, drilling rates varied with the wagon drills from 32 ft. to 200 ft. per shift, depending on which face was being drilled. However, it all passes specifications. The rock is classed by the operators as a bastard trap.

Drilling and Blasting Practices

The face of the quarry, which is roughly 30-ft. high, is drilled 17-ft. deep with holes that collar at 2⅞-in. and bottom at 1½-in. Drilling is on 7-ft. centers and 8-ft. burden. The bottom holes are drilled on 6-ft. centers and to 16-ft. depths sloping downward slightly. A few feet above (and drilled sloping upwards) are the breast holes

Loading truck with ¼-in. material for storage

Gas engine, to the left, drives belt conveyor which moves crushed stone from gearless crusher behind post

that are on 5-ft. centers and 12 ft. deep. These holes bottom at 2-in. The vertical holes are each loaded with 40 sticks of 1½-in. diameter American Cyanimide blasting gelatin; 60 and 70 per cent. Holes are dust stemmed from 7 to 8 ft. The bottom and breast holes are similarly loaded. In the bottom of the top holes are placed double primers (A's), in the breast holes are "B" primers, and in the bottom holes "C" primers. This arrangement of holes, when shot in groups that involve about 150-ft. of quarry face, gives a small amount of over-size stone and keeps the quarry face vertical. It was said that ¾-lb. of powder produced a cu. yd. of stone and the stone weighed about 2 tons per cu. yd. American Cyanimide electric delays are used.

A 1½-cu. yd. Northwest shovel loads Euclid dump trucks which haul to the Cedarapids portable plant. This plant is made up in three sections: The first section comprises the 25- x 40-in. primary jaw crusher with the scalping screen over it and related conveyors. This unit is powered by a Murphy Diesel engine mounted near the top of the assembly. The second unit comprises the 10- x 36-in. secondary jaw crusher, and the third has the final screen and a set of 24- x 40-in. rolls. The second section is driven by a D8800 Caterpillar Diesel mounted over the equipment, and the third unit has a Murphy Diesel driving through a shaft and universal.

Throughs from the primary jaw crusher go to a single-deck scalping screen having 2½-in. Roebling wire cloth. Undersize by-passes the main portable sections via a Barber-Greene cross-inclined belt serving a No. 25 Kennedy gearless crusher. The gearless crusher discharges to an inclined belt serving a two-deck, dry screen over steel bins. The top deck of this screen is ¾-in. wire and the lower deck ¼-in. Fines go to a dust bin. The oversize from the top deck is trucked back to the primary circuit, and the minus ¾-in., plus ¼-in., falls to its bin for truck loading.

Oversize from the scalping screen (plus 2½-in.) goes to the secondary jaw crusher and then to a 1½-deck vibrating screen with the top deck being the one-half section. This half, top deck, has 1½-in. mesh, and serves to relieve the lower screen. The oversize from both these decks goes to the rolls, the product being returned to this same screen. Here again a very heavy circulating load is maintained without difficulties. Throughs from the bottom

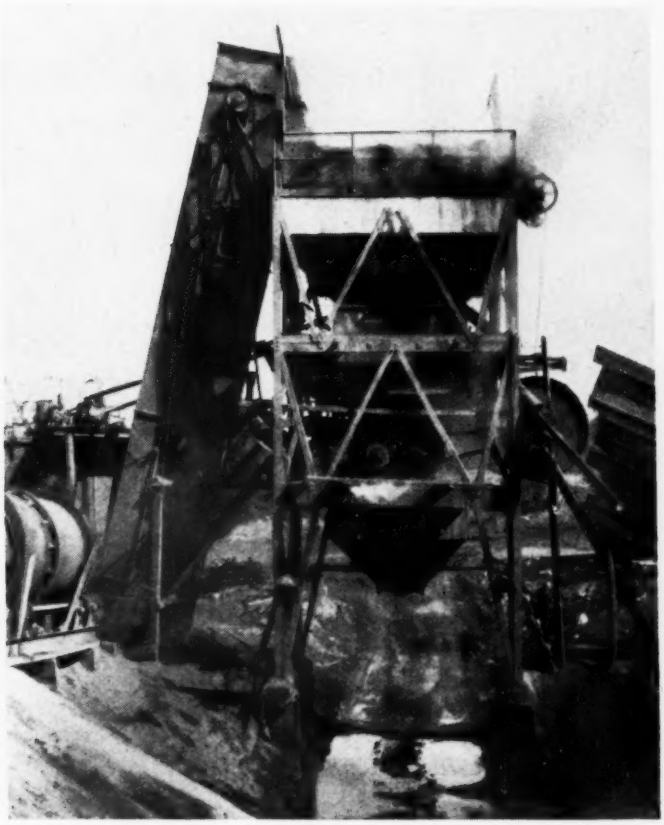
Looking down into quarry operated by B. Perini & Sons, Inc., for Maine Turnpike job

deck (minus ¾-in.) are trucked to the asphalt top plant nearby in a fleet of Autocar Diesel trucks. The plant has turned out about 150,000 cu. yds.

Crushed stone is delivered to the 4000 lb. Cedarapids hot plant located a short distance from the crushing plant and alongside the construction zone. Steam is supplied by a Standard Steel Corporation boiler and the plant is powered by a Murphy Diesel-electric unit. A Lorain clam shell delivers the aggregate to steel bins serving the cold elevator which in turn serves the Iowa oil-fired dryer.

Louis Capone is project manager for B. Perini and Sons, Inc., and Ralph Knox is superintendent. Eugene Costa is foreman of the crushed stone plant and S. Guerra, quarry superintendent.

Over-all view of Pioneer duplex plant operated by Gibbons and Reed for Maine Turnpike job



Two types of black top plant operated by Gibbons and Reed. To the left is the Seco river plant, and to the right is the South plant. Water in truck driveway prevents bitumen from sticking to truck tires

Two Portable Gravel Plants

TO PRODUCE AGGREGATES for the Maine Turnpike, two sand and gravel plants were operated by Gibbons and Reed. This company has the contract for the north half of the project. The most southerly plant is located near Biddeford, Me., on the south bank of the Seco river. This plant is a Pioneer No. 48-V, portable powered by a D13000 Caterpillar Diesel through a flat belt. The portable unit features a 10- x 30-in. primary crusher and a set of 32-in. diameter rolls. The crushed and screened gravel passes to a cross belt conveyor serving two 18-cu. yd. steel bins on top of which are mounted a vibrating screen for the final sizing.

Roll shells at every available opportunity are built up with an electric arc welder, using Stoodite as the hard surfacing metal. As the shells are bedded with babbit, the hard-surfacing with an arc welder must be done on the "installment plan," so as not to melt the bedding material. A Lorain shovel and fleet of trucks supply the plant from glacial deposits nearby.

This plant was moved into the area from Nevada having been in service near Kingman, Ariz., and Boulder, Nev.

Asphalt Plant

At this plant the black top unit is a portable No. 114 Standard Steel Corp. plant driven by a D17000 Caterpillar Diesel through a flat belt. The plant features the use of two Jeffrey electric vibrator feeders and a small endless belt type feeder for proportioning the sand-gravel and mineral fillers going to the cold elevator and thence to the dryer.

Dust from the plant is carried away from the working section by 400 to 500 ft. of 30-in. diameter corrugated pipe. No attempt is made to recover or use this dust—it is simply dissipated harmlessly into a thick patch of woods nearby.

Under the gob box from which trucks are loaded, water is kept in the roadway pit. This prevents the tar material from sticking to the tires of the trucks. All loads of bituminous concrete are covered with a heavy tarpaulin to help conserve the heat in the mass.

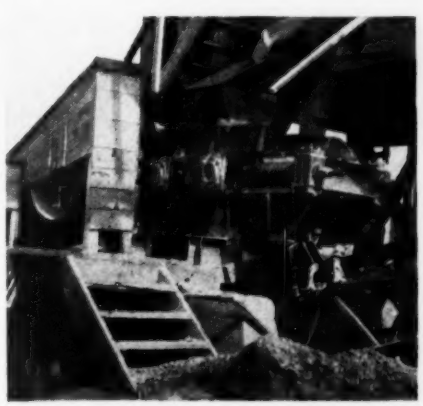
North Plant

This plant is on the north bank of the Seco river and not far from the plant previously described. At the time of inspection no bridge across the Seco was available so two plants were needed to round out an efficient program. This plant is a small Cedarapids unit, using a jaw crusher and rolls. A 1½-cu. yd. Link-Belt shovel is used in the pit.

The asphalt plant is a 4000-lb. Madsen batch unit and, similar to the black top plant to the south, has three Jeffrey electric vibrating feeders for the sand, gravel and mineral filler going to the cold elevator.

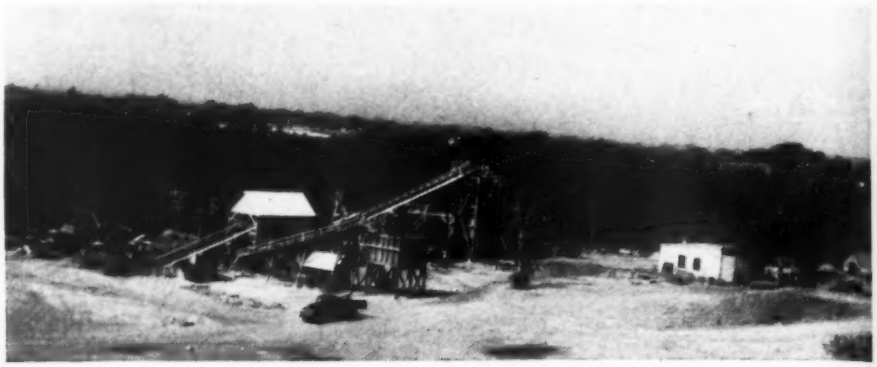
Both of the black top plants prepare bottom, middle, or top courses. In preparing the top course, crushed stone from either Perini quarry or crushed stone from the Blue Rock quarry near Westbrook, Me., is used.

Glen W. Nielson is local manager for Gibbons and Reed. Frank Bleazard is foreman of the south sand and gravel plant, and Sam Warner is foreman of the asphalt plant. Lawrence Gunter is foreman of the north plant. The home office of this company is located at Salt Lake City, Utah.



Blue Rock Quarry plant operates rolls

Wagon drill on top of Blue Rock Quarry drilling down holes



View of Blue Rock plant taken from top of quarry

STONE For Turnpike

FOR the south end of the Maine Turnpike the prime contractor, B. Perini and Sons, Inc., supplied most of the crushed stone from a portable plant, but at the north end of the job a considerable portion of the stone was secured from the Blue Rock Quarry which is located at Cumberland Mills, near Westbrook, Me. The latter town is about 6 miles west of Portland, Me. As the gravel in the area was unsuitable for the top course, crushed stone was required.

The Blue Rock Quarry is a commercial operation, having a plant capacity of about 100 t.p.h. of crushed stone. It also includes an Iowa Mfg. Co., Cedar Rapids, asphalt plant. Although it is a comparatively small operation, it has some modern features that should command attention. One of these features is the extensive laboratory for control of the operation. The "lab," located in the basement of the neat appearing office, has a soundproof room for equipment which includes: an R. M. Welch Engineering Co. ball mill for the Los Angeles rattler test work; a large size Gilson set of test screens, and an Iroquois asphalt test mixer as well as a wide assortment of chemical and physical chemical test apparatus. This laboratory control was in no small measure a vital factor in meeting the specifications of the Maine Turnpike Authority.

Drilling and Blasting

All primary drilling is done by Ingersoll-Rand X-71 wagon drills equipped with single drum tugger hoists for movement of the rig from hole to hole. As the quarry is close to the city limits, drilling and blasting is based on close spacing of holes and small charges of explosives. Vertical holes are drilled to a depth of 24 ft. Shorter bottom or snake holes pointing downward and breast holes started a few feet above the bottom holes (but sloping upwards), are drilled with the wagon drills. The steel starts with 2¾-in. and ends with 2-in. bits. Explosives are 40 and 60 per cent Dupont gelatin with the blasts being fired in three stages by electric delays.

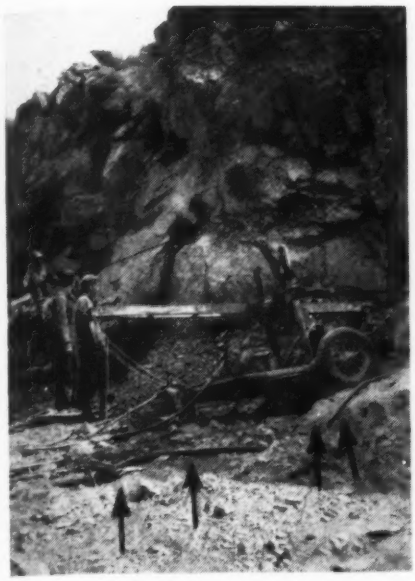
Plant Operation

Three stationary compressors, electrically driven, are mounted in a building near the center of the plant. The air supply enters a 6- x 30-ft. air receiver adjacent to the compressor building and is then carried by pipe line to a 3- x 8-ft. receiver located near the top center of the quarry. Air hose lines drop down from this assembly to the wagon drills. The compressor equipment consists of an Ingersoll-Rand ER-1, Ingersoll-Rand Imperial Type 10, and a Gardner-Denver Model WBH. The company also has an Ingersoll-Rand, Model IK-315, 2-stage, air-cooled, portable unit mounted on rubber tires. Secondary breakage is done almost entirely with a 5000-lb., octagon drop ball operated from a 50-ft. boom on a Bucyrus-Erie crane.

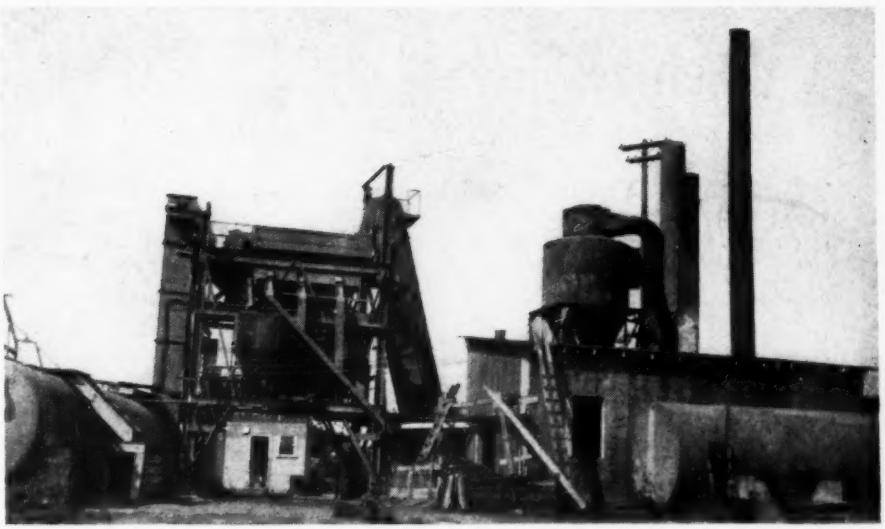
A 1-cu. yd. Bucyrus-Erie shovel in the quarry loads to a fleet of Sterling

General view of Blue Rock Quarry

Settling tank at Blue Rock Quarry for recovery of washed stone sand used in the asphalt plant



Wagon drill, foreground, working on bottom hole at Blue Rock quarry; breast hole being drilled in background. Arrows indicate short bottom "plug" holes to even up bottom



Black top plant at the Blue Rock Quarry

trucks which haul stone to the 24- x 36-in. Telsmith primary crusher, dumping from a ramp to a newly installed Telsmith heavy duty feeder. The crusher discharges to an inclined belt serving the scalper which is a triple-deck Telsmith screen, operating dry. The oversize from the top deck falls to an 18- x 30- Telsmith secondary jaw crusher, which discharges to a return belt and to the belt serving the scalper screen. The stone passing the top deck falls to a cross conveyor and is delivered to separate truck loading bins. A switch arrangement of chutes from this screen allows optional use of two or three decks permitting the larger size stone to be conveyed to the "separate truck loading bin" or up the main belt for re-crushing. Material passing the second deck flows to a 36-in. Telsmith Gyrosphere with standard concaves and is returned on the same belt with stone from the secondary jaw crusher. All material passing the bottom deck falls to the longer conveyor belt serving the main plant where a Telsmith triple-deck, wet-operated screen is employed for the final sizing. The coarsest sizes can be chuted from bins to a second Telsmith Gyrosphere equipped with fine crushing concaves. The product of the gyrosphere returns to the system via an inclined belt conveyor serving the previously mentioned long belt. Material passing the lower deck flows to a single-deck Kennedy Van Saun screen which in turn passes a finely graded stone dust (aided by water) into a sink and then via pipe to a Telsmith settling tank located adjacent to the main plant. The dust is trucked to the asphalt plant and used in the bituminous mix.

All of the crushed stone produced at this plant is thoroughly washed. The original water is obtained from the Portland Water District but is reclaimed for re-use by means of a settling basin and pumping system designed by the company's chief engineer, Mr. C. F. Parker. The water, containing waste fines, spills from the settling tank into a ditch, thence into the basin. It travels about 750 ft. over a series of log riffles spaced about 50 ft. apart which precipitate the fines, resulting in clean water at the 35 ft. long earth dam which maintains the proper water elevation. A 12-in. pipe leading from the basin, at an elevation 3 ft. below the normal water level, carries the water by gravity to a 3000-gal. tank set vertically in the ground at the pump house. The pump is an Economy which furnishes water at 46 lbs. pressure to the various spray bars equipped with Link-Belt nozzles.

The Blue Rock Quarry is a subsidiary of W. H. Hinman, Inc. Mr. P. V. Corey is general manager of the Hinman Corporation, with Mr. C. F. Parker, chief engineer. The quarry is managed by N. W. Blethen.

[For ready mix operations of Cook & Co., Inc., see the Concrete Products section.]

Important Decision on Alleged Blasting Damage

THOSE who have attended recent conventions of the National Crushed Stone Association are probably more or less familiar with the case of certain residents of Poughkeepsie, N. Y., who have been claiming damages from the New York Trap Rock Corp., for alleged personal injuries, and injuries to real estate, as a result of blasting operations. This particular case, J. Freeman Dixon and Katherine S. Dixon vs. the corporation, has an interesting history, a summary of which we have obtained from a "Memorandum of Opinion," by George H. Taylor, Jr., official referee, appointed by the Supreme Court of New York, County of Dutchess. At this writing, it is not known whether the court has affirmed the referee's decision or not.

The plaintiffs are residents of a stone and stucco house, with outbuildings, over a mile from the quarry (6300 ft.). In 1941 they sued and were awarded damages from the quarry corporation, $7500 for damage to their freehold and $2000 for Mrs. Dixon's alleged personal injuries. This award was made by a referee, the $2000 personal injury award was reversed by the Appellate Division, and later reinstated (or reversed again) by the Court of Appeals.

From January 1, 1941, on, the company naturally took every possible precaution to prevent further claims and kept accurate, scientific data on all its blasting operations. However, two years later, in 1943, the same plaintiffs brought a new suit under similar claims. This case also went to an official court referee, and in this instance the company was prepared for all eventualities with voluminous records and expert evidence, including testimony by Dr. L. Don Leet, seismologist of Harvard University, who has lectured several times before the National Crushed Stone Association conventions.

On the basis of all the evidence submitted by the New York Trap Rock Corporation and its records and its experts, and from the personal experience of the court referee himself by being present at two or more blasting operations, he comes to the conclusion that there could not possibly be any damage to the buildings of the plaintiffs from the minor vibrations caused by the blasting, nor any personal injuries as claimed. With the help of Dr. Leet's expert opinion, the referee concludes that the alleged damage to the plaintiffs' residence, which was constructed in 1931, is caused entirely by faulty construction and absolute lack of any maintenance, it having been the policy of the plaintiffs to purposely let the property fall into disrepair for the strengthening of their case of alleged blasting damage.

Pennsylvania Producers Meet With Highway Department

Joint meeting of stone, slag, and sand and gravel producers with Highway Department officials plan for big road construction program

H. H. Wagner, left, secretary of Pennsylvania Stone Producers Association, standing alongside T. C. McPoyle, the president

PENNSYLVANIA has planned for 1948 the largest highway building program of any state in history, according to figures revealed at the second meeting of the aggregates industries, construction industry and bituminous concrete producers with Pennsylvania Department of Highways officials. The meeting, conducted by the Pennsylvania Stone Producers Association, was held January 7 and 8 in Harrisburg to consider how the highway construction industry could best cooperate with the Highway Department in fulfilling a program involving the expenditure of $110 million plus a $60 million dollar carryover from 1947.

Over 300 attended the meeting, including all top flight engineers of the Highway Department, its field engineers and producers of all classes of aggregates cooperating interests. In addition to the sponsoring association, were the Pennsylvania Slag Association, Pennsylvania Sand and Gravel Association, Associated Pennsylvania Constructors, Constructors Association of Western Pennsylvania, Contractors Association of Philadelphia and the Bituminous Concrete Association of Philadelphia.

The program was unique in that the three competitive aggregates industries cooperated as a unit in the discussion of problems, with highway engineers, for the furtherance of the highway building program. The aggregates industries had been hard taxed to meet demands of the 1947 highway building program, which led all states that year, and upon which a 60 to 65 per cent greater demand is to be imposed in 1948. Failure to meet specification requirements had resulted in some rejections and actual plant shutdowns in 1947, and the tone of this meeting was one of cooperation by highway engineers and producers in an endeavor to eliminate these failures. Another innovation was a program in which producers had prepared talks concerned with specific operating problems which were then discussed by highway engineers.

ED. SCHMIDT, chief engineer of the highway department, the opening speaker, and C. H. Buckius, assistant chief engineer, outlined the scope of the 1948 program and the requirements for materials. Engineers in charge of maintenance and construction presented figures on their specific requirements. H. H. WAGNER, general manager of the Pennsylvania Stone Producers Association, presided over this opening session.

Producers of aggregates entered this Winter with stockpiles depleted because of heavy highway demands in the 1947 Fall construction season and were urged to produce at maximum capacity throughout 1948 with the promise that all aggregates would be utilized. Requirements in 1948 are for 9,137,004 tons of crushed stone, 1,638,434 tons of sand, 757,904 tons of bituminous concrete and 3,772,536 bbl. of portland cement.

Photos—Courtesy Constructioneer

This sextette didn't sing: H. M. Binkley, Binkley Bros. & Ober; Sam Narehood, Narehood Bros.; J. Albert Savage, Mausdale Quarries; J. Allen Heim, Lycoming Silica Sand Co.; F. I. Narehood, Narehood Bros.; and C. R. Binkley, Binkley Bros. & Ober

Producers were urged to repair their plants immediately and to start production earlier than ever before this coming Spring to start building up stockpiles since it is planned to open for bids $40 million worth of construction the first four months in 1948 in order to avoid extreme construction peaks in the Fall.

Inspection, Sampling and Testing

In commenting on rejections, highway engineers strongly recommended that producers undertake more inspection at their plants as a means of eliminating delays and wasted expense. They advocated having a qualified man at each plant, as an ideal, to handle the sampling and testing.

H. HERSHEY MILLER of the Pennsylvania Sand and Gravel Association, in a discussion of inspection, sampling and testing, said that much aggregate, acceptable as tested at the plant, is rejected at destination because of faulty methods of stockpiling and reclamation at the plants. Most rejections are of stockpiled materials, he said. He stressed the need for a great deal of work to be done toward the correct interpretation of the adverse effects of flat and elongated pieces of aggregates. Many of the rejections in 1947, incidentally, were due to an excess of such aggregate particles over the 5 per cent permissible limit in Pennsylvania.

In commenting on Mr. Miller's presentation, highway engineers insisted that very little can happen to cause rejection of aggregates if they meet specifications at the plant and are handled properly in loading cars or trucks. The Department demands that aggregates be acceptable as they are made available by the contractors at the job. It further desires uniformity of grading day by day within the permissible standards as an aid to the design of paving mixes. The Highway Department expressed a desire to help producers avoid rejections of stockpiled materials even to sending out inspectors to plants on request to assist in correlating plant practice with their test findings.

H. HERSHEY MILLER, Pennsylvania

Sand and Gravel Association, presided over the second session.

Effect of Flat and Elongated Aggregate

A. T. GOLDBECK, engineering director, National Crushed Stone Association, in discussing the "Effect of Flat and Elongated Aggregate on Concrete, Macadam and Bituminous Mixes," stressed the need for more knowledge supported by facts in setting limitations for so-called flat or elongated particles of aggregates. He pointed to the wide variations in permissible percentages of such aggregate particles, and to the lack of definition and indefiniteness in many specifications written by authoritative organizations which leave much to the whim of engineers on the job.

He discussed briefly the results of tests that have been made to determine the effects of various percentages of flat and elongated particles on workability of mixes, strength of concrete, etc. For certain common concrete mixes, up to ten or fifteen per cent flats and elongated particles in the aggregates resulted in no decrease in strength. He pointed out that flat and elongated pieces do not lie in a horizontal position in concrete as some might suppose. Where excessive percentages do occur within reason, and more voids occur as a result, he mentioned that proportioning could often compensate for the condition.

Air-entraining cements give more workability to a mix which, in his opinion, will compensate for the tendency of flats and elongated particles to impart harshness to fresh concrete. There are wide variations in the prevalence of these particles for different quarries, he said, in commenting on tests conducted from 65 sources, which suggests that the high costs in plant reconstruction and operation might well offset the value of reducing such particles. Abnormally long, needle-like pieces should of course be minimized insofar as practicable to do so.

Mr. Goldbeck discussed test road sections of certain types which showed no difference where aggregates with and without appreciable quantities of flats and elongated particles were used. Another point brought out was that angularity as such is definitely needed for flexible types of pavements. He concluded by suggesting that a study of various plants should be the basis for establishing limits in specifications.

A. R. AMOS, Smith Engineering Co., Philadelphia, followed with a paper suggesting methods for reducing the amount of flat and elongated pieces in the production of aggregates. A steady feed of stone to primary crushers is beneficial, he said, and choke feed (keeping crushers full) is desirable, due to accompanying attrition. Closing up the discharge opening of secondary crushers was another suggestion to minimize the percentage of particles with undesirable shapes and, possibly, slowing the speeds of crushers. Keeping manganese plates and other crusher wearing surfaces in good condition also helps, he said.

This group includes: Wm. A. Warrick, chief construction engineer, Pennsylvania Department of Highways; A. E. O'Brien, secretary, Association of Pennsylvania Constructors; H. H. Wagner, general manager, Pennsylvania Stone Producers Association, Inc.; and Wm. E. Crook, J. E. Baker Co.

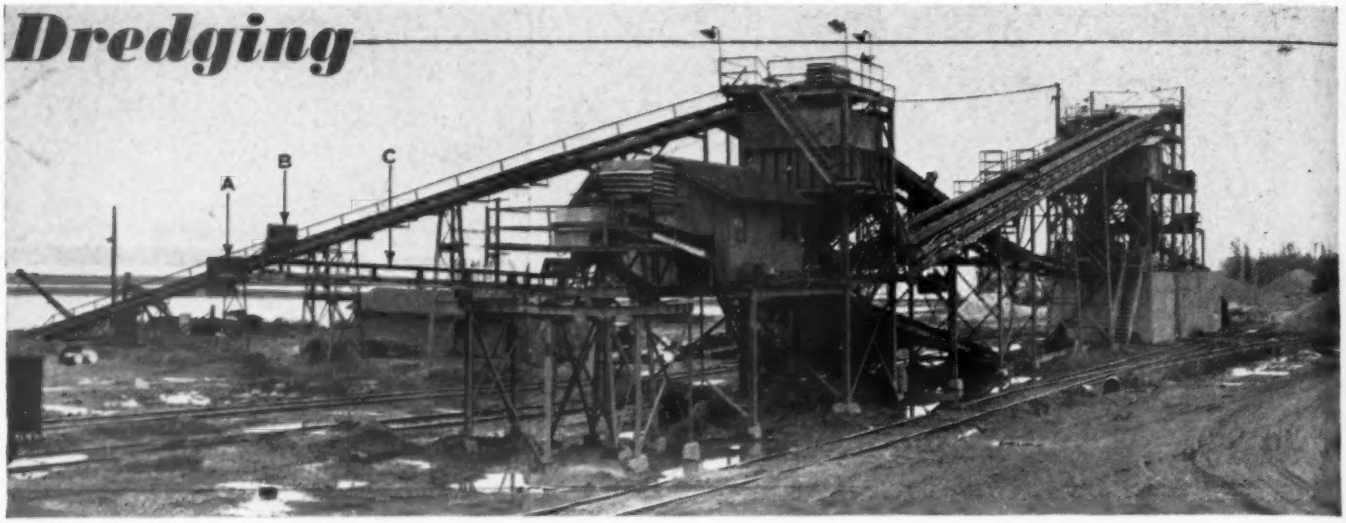
In screening, it is sometimes desirable to carry over the maximum of flats and elongated particles with the tailings. Operating speeds of vibrating screens may be adjusted and the stroke reduced so that there will be lazy deck action to minimize cascading and the tipping of long aggregate pieces so that they may be carried over with the tailings. Screen openings of minimum opening to produce sizes falling within specifications will, of course, help. Flat and long pieces thus kept out of a given product may then be routed with the tailings for re-crushing and thus become part of a smaller size of finished product.

Other methods, involving an additional stage of screening, would pass these particles through a screen with a surface of long slotted openings and then by way of a chute to a re-crusher. For screening out these particles, a screen of generous width is recommended, with slotted openings parallel

(Continued on page 122)

A General Crushed Stone Co. threesome: Geo. E. Schaefer, Oscar Benson, and Arthur Barnes

In this view may be seen: E. A. Weymouth, Pittsburgh Limestone Co.; John Curtin, Sr., Warner Co.; Nicholas Cascetti, Stowe Trap Rock Co.; and Vincent Pietsch, Bacon Pietsch, Inc.



To the left, conveyor inclining up from gravel barge delivery dock with 60-ton surge hopper, upper center; house containing automatic conveyor belt scale, center; and screening and crushing station over five concrete bins, to the right. Note (A) deflector baffle on end of carloader; (B) carloader motor cover; (C) conveyor (No. 6) belt on carloader. Semi-circular track for carloader swings over either track

CONVEYOR BELT SYSTEM

Cuts Material Handling Costs

Sangravl Co., Inc., Johnsonville, Tenn., builds new plant to process 2000 tons per day production from dredge

By DAVID MOCINE

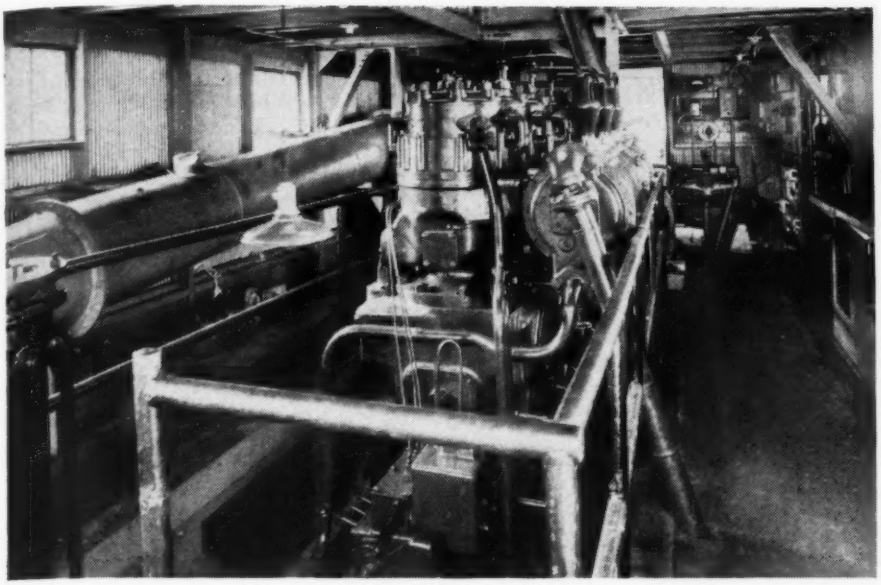
LOCATED on the shore of Kentucky Lake, a body of water backed up from T.V.A. Gilbertsville dam on the Tennessee river, Sangravl plant No. 1, Johnsonville, Tenn., has been built by Sangravl Co., Inc., as a wholly new sand and gravel processing plant. Plant No. 1 was situated four miles down river from its present location for 20 years, but had to be moved when water from the Gilbertsville dam backed up to the site, which is now under an average of 10-ft. of lake water. The new plant is approximately 60 miles from the dam and 100 miles above the confluence of the Tennessee and Ohio rivers.

Although most machinery in the plant is new, it was necessary to bring some equipment over from the old operation, and the dredge is a case in point. The first plant had depended on shallow river dredging as a source for material, but the new plant was faced with the problem of much deeper lake work. The dredge barge was rebuilt and enlarged to take care of extra pipe and additional machinery needed for the new operation. Pump and engine to supply power for the operation are the same as at the old location, though new motive power is being considered.

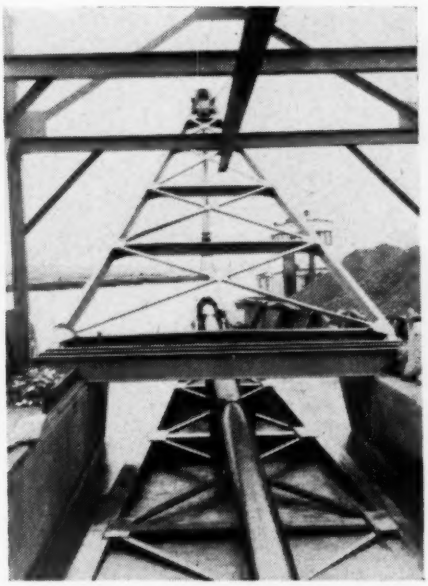
Over-all view of dredge, showing scalping screen, top; gravel conveyor, center; and Diesel exhaust

Essentially the operation consists of dredging 2000 tons of sand and gravel in a 10-hr. day, which is separated and loaded into barges at the dredge. These barges are towed to shore by Diesel-powered tug where they are unloaded by a clam shell, the material being deposited in a hopper feeding a belt conveyor for elevation to the plant. The plant is highly flexible, with provision for such material as river-run sand being loaded directly to railroad cars without passing through further screening process. A large demand exists for river-run gravel as ballast and fill material. This is made possible by a well engineered and extensive belt conveyor system. In order to do away with bucket elevators or other means of material elevation, all material transfer in this plant is by means of belt conveyors, with the steepest pitch being 13 degrees.

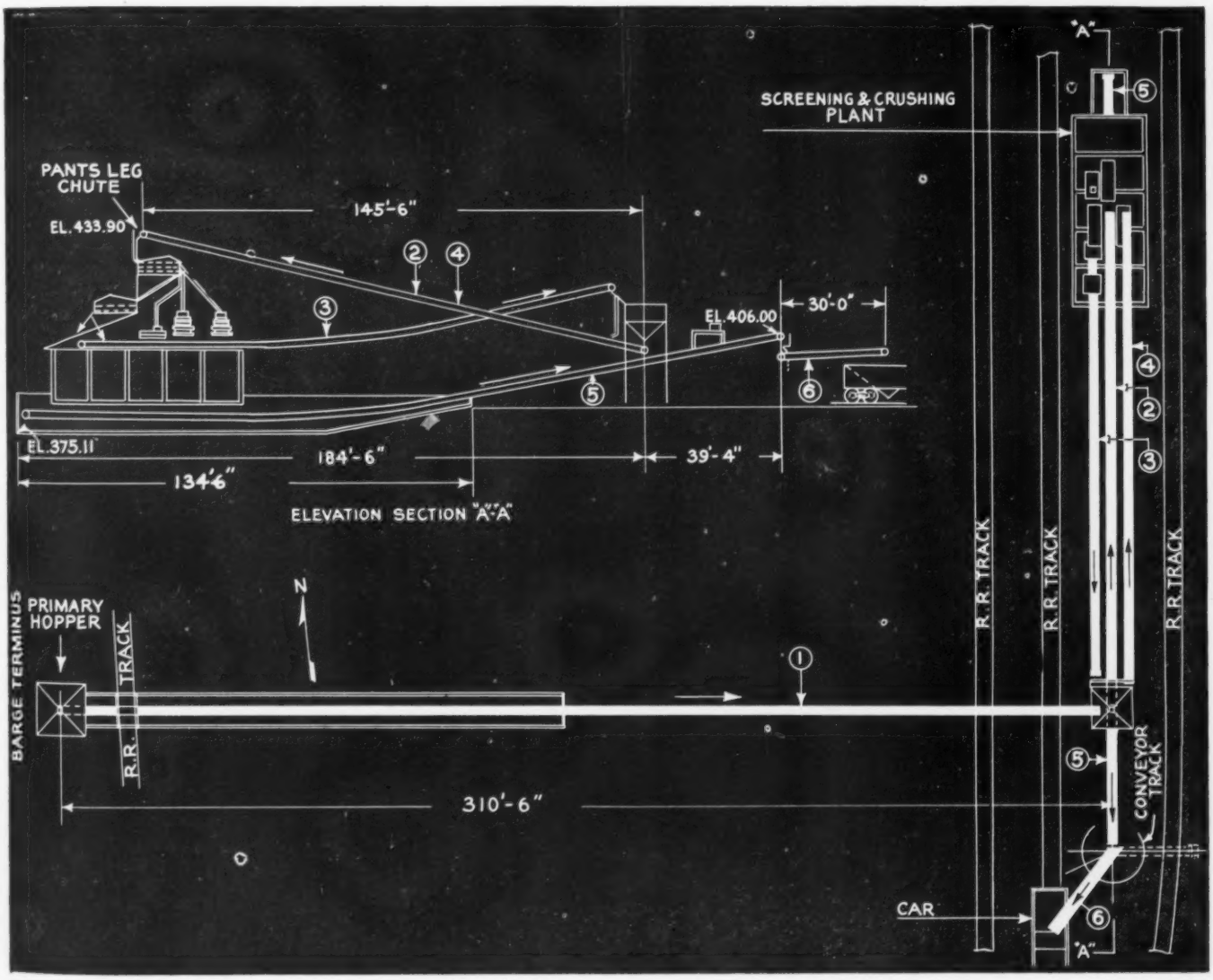
Material dredged from the lake bottom passes through a primary screening station before being loaded to barges. Sand and gravel is piped directly from a 12-in. suction, 10-in.



Diesel which operates dredge pump

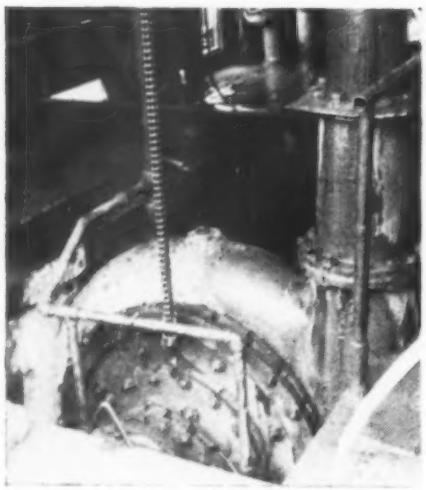


Raising dredging ladder. Loaded barges, right



Flow plan of material handling system. River run material is moved from barges to primary hopper (lower left) over conveyor No. 1, or may be loaded by clam shell directly to rail cars on adjacent track. Material is discharged from conveyor No. 1 to surge hopper for diversion either to No. 2, for elevation to the screening, crushing station; or to No. 5, for transfer to No. 6 for rail car loading of river run material. From screening, crushing station, material may be diverted to either bins by gravity or back over screens in a closed circuit by conveyors Nos. 3 and 4 (see side elevation of plant, upper left). The lower end of conveyor No. 5 operates in a reclaiming tunnel under the bins, and elevates reclaimed material, either straight or blended from several bins, through the weighing station to the car loader, No. 6

Close-up of belt conveyor carloader



Dredge pump, 12-in. suction, 10-in. discharge

In the foreground may be seen conveyors Nos. 4 and 2 with No. 4 carrying material from crushers, No. 2 moving material from lake barges; No. 1 conveyor to the right; No. 3 conveyor in the center carries crushed gravel to No. 4 conveyor, inclining up, to the left

discharge dredge pump to a stationary double-deck primary screen, with ½-in. mesh on the top deck (which acts primarily as protection for the lower deck of ¼-in. mesh). Sand, minus ¼-in., is flumed to a barge on one side of the dredge and gravel, plus ¼-in., is loaded to a barge on the other side of the dredge by a 25-ft. belt conveyor. Production of gravel to sand at this deposit is approximately in the ratio of three to one. In addition to the 180-hp. Diesel motor that supplies power for the dredge pump, a 115-hp. Diesel motor direct connected to an electric generator produces current for all secondary power on the dredge.

A 100-hp. marine Diesel powers the tug that makes a usual tow of two loaded barges for the ¾-mile run between the dredge and shore installation. Present barge equipment consists of nine all-steel barges of 350-ton capacity each. A 22-ton revolving electric hoist mounted on a reinforced concrete pilon at the barge terminus unloads barges with a 3-cu. yd. clam shell. A 150-hp. motor powers the hoist, and a 40-hp. motor provides power for the swing. Material from barges is transferred to a 90-ton hopper that feeds by gravity flow a 30-in. conveyor (No. 1), on 310 ft. centers, through a manually operated gate. Conveyor No. 1, with 350 t.p.h. capacity, operates at 275 f.p.m. to elevate material 57-ft. from lake shore to the plant. Power for this conveyor is provided by a 30-hp. slip ring motor.

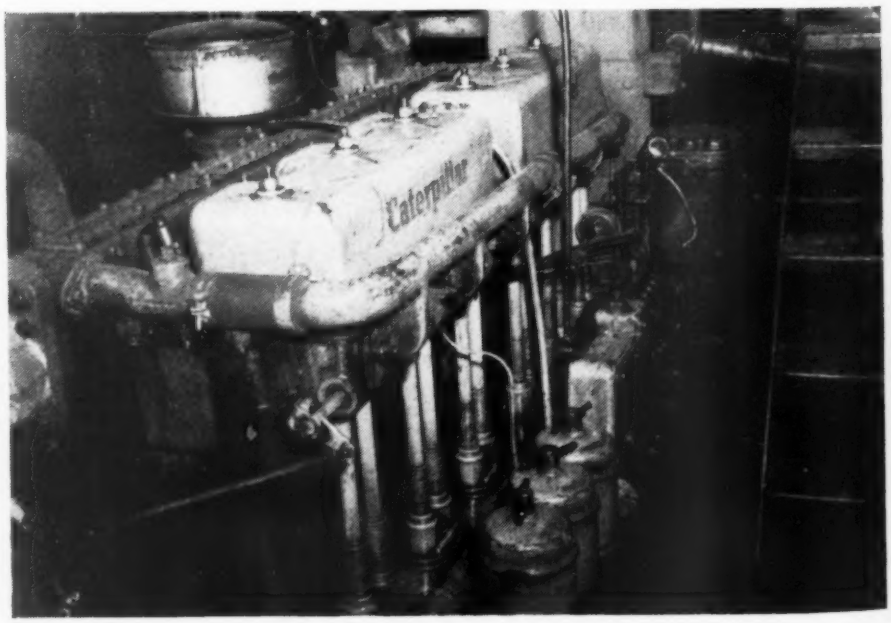
Provision is made at the barge terminus for loading river-run material directly to railroad cars from barges by clam shell, but due to cramped space at this point, such material is usually loaded at the plant level where adequate switch tracks are available.

Screening Plant

Conveyor No. 1 discharges to a 50-ton surge hopper at the main plant. Material from this hopper may be diverted by means of a flop gate to either conveyor No. 2 or No. 5. When river-run material is to be loaded from the surge hopper to railroad cars, it is diverted to conveyor No. 5 at a point 40 ft. from its upper end which transfers it to (No. 6) swing-loader conveyor belt, 30-ft. centers. Details of both conveyors No. 5 and No. 6 will be discussed later.

When material from the barges (conveyor No. 1) is to be processed through the plant, it is fed from the 50-ton hopper to conveyor No. 2, a 30-in. belt on 145 ft. centers (conveyors Nos. 1, 2, 3 and 4 are all 30-in. belts and operate at 275 f.p.m. with 350 t.p.h. capacity). Conveyors 2, 3, and 4 are each powered by 20-hp. motors. Material from conveyor No. 2 is discharged into a pants-leg chute for diversion over either or both of two 3-deck 4- x 12-ft. vibrating screens operating in parallel. These screens may also receive feed from another belt in a closed grinding circuit, hence their large capacity and pants-leg chute system. The screening-crushing station is mounted over five concrete storage bins of 100-ton capacity each. Recovery from these bins is by belt No. 2.

Mesh sizes on the 3-deck screens are usually: top deck, 1¼-in. mesh; middle deck, ¾-in. mesh; and bottom deck, ½-in. mesh. The flow may be changed at the point of discharge from the screens, depending on whether the demand is for crushed gravel or uncrushed, concrete gravel. In the first instance, oversize from the first deck, plus 1¼-in., is chuted to No. 1 crusher, a 3-ft. cone, set for 1¼-in. opening, which discharges to a con-

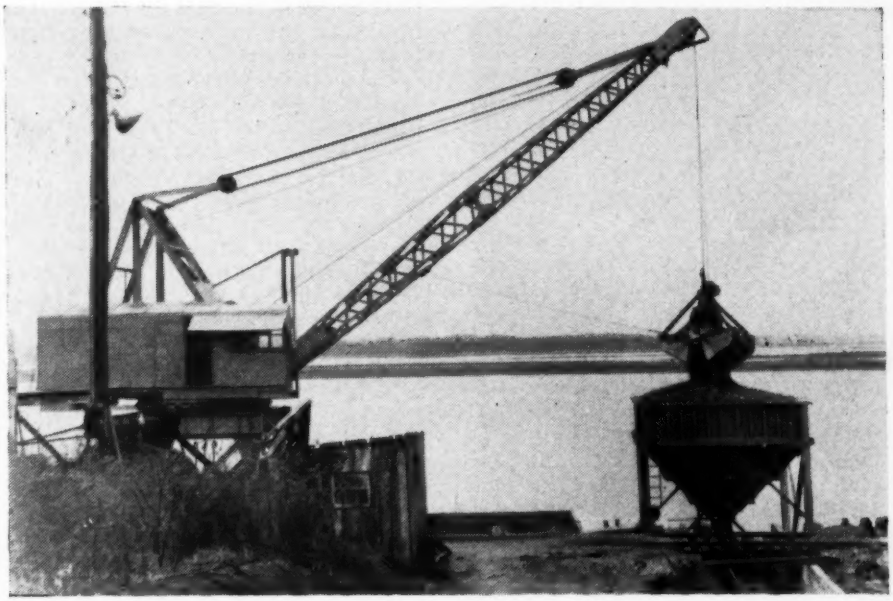


Marine converted Diesel on tug boat

crete storage bin directly below it. Oversize from the second deck, minus 1¼-in., plus ¾-in. is chuted to crusher No. 2, also a 3-ft. cone, set for ¾-in. opening, which discharges to a second bin. Oversize on the bottom deck, minus ¾-in., plus ½-in. is chuted to crusher No. 3, a roll crusher set for ½-in. opening, which discharges to a third bin. Throughs from the bottom deck, minus ½-in., are chuted to a fourth bin.

When concrete gravel is desired, an alternate flow-plan is used, which includes a secondary screen and a change in mesh sizes of the middle and bottom decks of the two 3-deck screens running in parallel. Oversize from the top decks, still plus 1¼-in. stone, is chuted to crusher No. 1, which is set for 1¼-in. opening and discharges to belt conveyor No. 3 for return to the primary screens in a closed circuit. Conveyor No. 3 is a 30-in. belt on 164 ft. centers which elevates the crusher discharge to a point near the top of the surge bin that receives material from the barges, from where the crusher discharge material is chuted to conveyor No. 4 for return to the two 3-deck primary screens. Conveyor No. 4, also a 30-in. belt, operates immediately along side No. 2. Both belts discharge into the same pants-leg chute, mentioned previously.

When demand is for concrete gravel, the middle deck of the two primary screens is changed to 1-in. mesh and the bottom decks to ¾-in. mesh. Oversize from both these decks are chuted to bins, with throughs from the bottom deck, minus ¾-in. stone, being chuted to a 4- x 12-ft. double-deck vibrating screen with ½-in. mesh and ¼-in. mesh on the bottom deck. Oversize from the top deck of the secondary screen, minus ¾-in., plus ½-in. stone, is chuted to a bin; as is oversize from the second deck (minus ½-in., plus ¼-in.) and throughs from the bottom deck, minus ¼-in. The five concrete storage bins with a total capacity of more than 500 tons, hold stone and sand ranging in size from plus 1¼-in. to minus ¼-in.

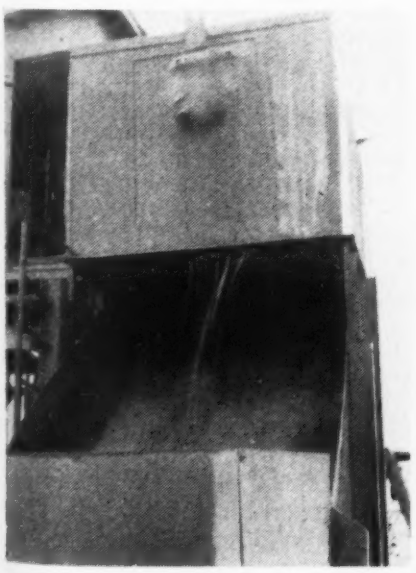


Unloading barges with 3-cu. yd. electric clamshell to hopper over belt conveyor

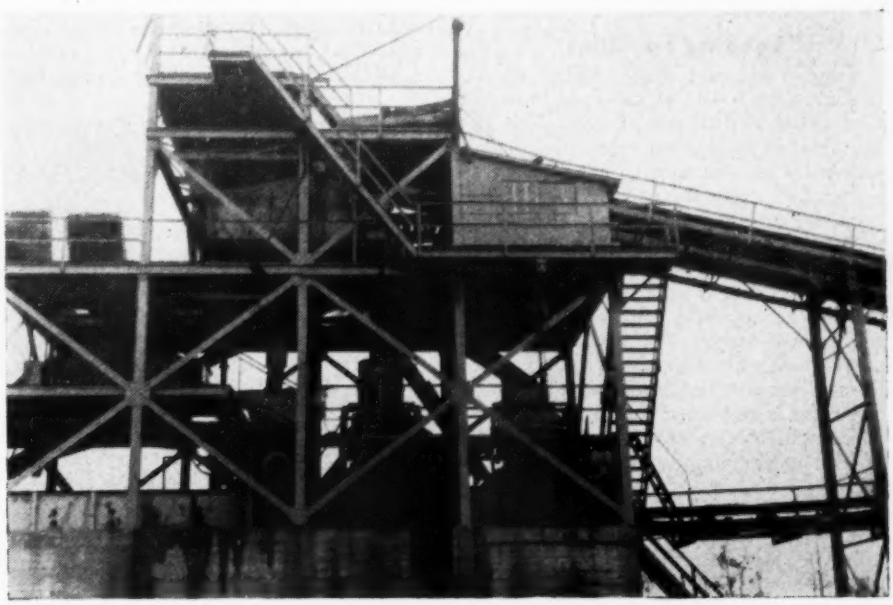
Material produced at this plant, locally known as crushed gravel, is sold principally for railway ballast and to hot-mix plants. Concrete gravel, manufactured at this plant in a closed circuit, finds an outlet to ready mixed concrete plants, highway programs, dealers and contractors throughout middle and west Tennessee in a radius of approximately 175 miles. Shipments from the plant are roughly 95 per cent by rail and 5 per cent by truck.

Conveyor No. 5 is a tunnel conveyor that reclaims material from the five bins, each equipped with a manually controlled circular gate. This system allows for blending any two or more grades of sand and/or gravel on the belt for final delivery to rail cars. Continuous weight of material being loaded to cars is registered by a Merrick Weightometer located on conveyor No. 5 just ahead of its discharge point to conveyor No. 6, the car loader belt. This scale gives a continuous total weight of material passing over the belt as well as the total amount of sand, gravel or blended material loaded into any one railroad car. Weight of river-run material being loaded to cars at the plant level also is recorded by the scale. In addition to loading out carload orders, cars are also loaded by the same belt system for material transfer to the stockpile area.

Receiving material from the discharge end of conveyor No. 5, a car-



Stationary scalping screen on top of dredge house. Gravel is conveyed to barge, right; sand flumed to barge, left



Screening and crushing station over storage bins. Note two cone crushers, right, and one roll crusher

Lower end of conveyors No. 2, to the left, and No. 4 to the right

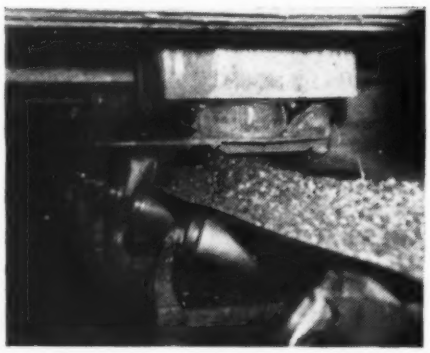
loader makes use of a 36-in. belt (No. 6) on 30 ft. centers with a rated capacity of 820 t.p.h. This mechanism was made in the company shop and is essentially a movable belt conveyor capable of swinging in an arc of 145 deg. so as to serve cars spotted on either of two tracks paralleling opposite sides of the plant. Pivoted at the end directly below the discharge point of conveyor No. 5, a raised semi-circular track about 8-ft. out from the pivot provides a runway for the carriage that acts as a fulcrum to support the extended overhang of the loader. This type of car loader aids in preventing segregation of product. A 15-hp. motor, mounted above the discharge end of the belt, provides power; and a shield deflects material from the end of the belt downward into the cars. Below the steel superstructure supporting the semi-circular car-loader track is a car puller powered by a 20-hp. slip ring motor.

Loading Facilities

Loaded cars are moved to the stockpile area by a Diesel powered locomotive crane, a distance of about 300 ft. Material is stockpiled from these cars either by the locomotive crane with a 1¼-cu. yd. clam shell or by a gasoline powered crawler crane equipped with a ¾-cu. yd. clam shell. The locomotive crane is also used to empty a settling tank for recovery of wash-water fines, located at one end of the plant. Recovery of minus 50- and 100-mesh sand from this deposit is insufficient to meet present day specifications, and fine sand is imported for blending purposes, which is accomplished by means of conveyor No. 5, previously mentioned.

On the dredge, a Worthington Diesel powers an American Manganese pump; while auxiliary electricity is provided by a Caterpillar Diesel 1300, turning a General Electric generator. The tug is powered by a motor identical to the motor driving the generator, with the only difference being that the tug motor is a marine conversion. At the shore terminus of the sand and gravel barges, material is transferred to the plant conveyor hopper by an American Hoist and Derrick Co. electric American Revolver. The plant conveyor system was engineered by Link-Belt Co., and uses Link-Belt idlers and Manhattan Rubber Co. belting. Heaviest belting is 5-ply, 32-oz. duck, forming the belt on No. 1 conveyor, 310 ft. centers.

Electric motors that operate the conveyor belts, screens, crushers and hoist are General Electric, Century Electric, Westinghouse and Allis-Chalmers. A Cameron 8-in. suction, 6-in. discharge pump supplies lake water to the plant, and is powered by a 40-hp. squirrel cage motor. The two 3-deck and secondary double-deck screens are all of Allis-Chalmers manufacture. The two crushers are Symons 3-ft. cones; while the roll crusher



Circular discharge gate (manually operated) under storage bins

is an Austin-Western. Yard cranes are an American Locomotive, "Caterpillar" Diesel powered, and a Bucyrus-Erie, gasoline powered, crawler equipped. The plant maintains a shop which is so completely equipped as to be able to handle 90 per cent of all repairs and maintenance work required at the operation.

Plans for the immediate future call for placing in operation a new tug, now being built by Jeffersonville Boat Works, Jeffersonville, Ind. The new tug will be larger than the one now in use and will be powered by a "Caterpillar" Diesel marine D17000, rated at 130 hp. A Fairbanks, Morse 30 ton type S truck scale is to be installed to take care of large semi-trailer units that are frequently loaded out and that are too large to be weighed on the present scale. Two "Caterpillar" Diesel D13000 engines are going to replace the Diesel now in use on the dredge for pump power, but that has given trouble-free service since the dredge was built.

Allen Carman, production manager

Being 80 miles southwest of Nashville, Tenn., and even farther from Memphis, this new plant is set in such scenically beautiful and semi-wild surroundings that workers are successful rabbit hunters in their half-hour lunch period. Sangravl Co. obtained priorities for constructing the new plant during the war because it was forced to abandon the old site, but despite priorities, the plant was completed in record time. Sangravl Co., Inc., is a subsidiary of T. L. Herbert & Sons, Nashville, Tenn.; headed by T. L. Herbert, Jr. Allen Carman is production manager of plant No. 1, and dredge foreman is Ray Townsand. Geo. Strickland is captain of the tug Joe Belk.

Northern Cement Plants Prepare for Record Year

EVEN THOUGH cement production is expected to be 10 per cent greater this year than in 1947, manufacturers in Ohio and other Northern states still say demand will exceed supply. In anticipation of this, and working under a handicap created by an exceptionally late Fall which sustained demand for cement longer, the Northern plants plan to continue production right through the Winter. The plants all provide storage space for at least 25 per cent of capacity, and ordinarily filled the bins in Winter, then shut down until Spring.

R. D. RAFF, president, Diamond Portland Cement Co., Middlebranch, reported that it is doubtful if the company's bins will be full by Springtime regardless, as the firm is now in the midst of a building program to increase capacity by 50 per cent. This firm produced 800,000 bbls. of cement in 1947 as compared with 700,000 in 1946. Estimates of 1948 demand are based on continuing heavy construction in industry and the home building fields, Mr. Raff said.

Cement Article Correction

IN THE ARTICLE "Cement, The New Gold of the Caribbean," that appeared in the December issue, ROCK PRODUCTS, the cost per kw. hr. for 18 kw. hr. per bbl. should have read one cent per kw. hr. rather than nine cents.

Labor Relations Trends

(Continued from page 73)

tation that the plaintiffs were entitled to compensation for preliminary activities or postliminary activities.

"The court is mindful of the averments that such compensation is granted because of custom and practice. However, when it appeared that there was an express contract between the defendant (employer) and its employes relative to their compensable activities, then any custom or practice to the contrary would be superseded and the express contract would control. Since an interpretation of the contract pleaded does not disclose any basis for compensation as asserted by the plaintiffs, their complaint fails to state a cause of action cognizable in this court, and the complaint should be dismissed for want of jurisdiction."

The most recent case, at this writing, was decided December 15, 1947, by the U. S. District Court, Western District of New York, on a motion by the defendant employer to dismiss a suit brought by a group of employes in conformity with the new requirement that each must be named. Judge Knight said in part: "In the brief time since the Portal Pay Act was enacted, motions in effect, as here, have been decided in many Federal District Courts throughout the United States. I have read many of these decisions. So far as I have learned there has been a unanimity of decisions save in a few cases, that the portal Pay Act is constitutional. No Circuit Court of Appeals * * * has yet passed on the questions * * *."

The plaintiffs based their whole case on the theory that the Portal-to-Portal Pay Act violated the Constitution of the United States because it "is an attempt to control jurisdiction and procedure to defeat substantive rights guaranteed by the Constitution; that the Act violates the 5th Amendment of the Constitution by depriving the plaintiffs of their property without due process of the law and violates Article III, Section 1, of the Constitution through an attempt [by the Congress] to exercise judicial power reserved to the courts." The substance of this court's decision is that the plaintiffs had no vested rights in their claims, but only statutory rights created by Congress, which of course can withdraw such rights as well as create them. The decision was in line with the others, that the Portal-to-Portal Pay Act is constitutional.

There is one case decided by the U. S. District Court, Northern District of Texas, in which Judge Wilson held an opinion contrary to those given. He overruled a motion by the employer to dismiss a suit of employes. He held: "The courts are called upon to construe or nullify the Acts of Congress, but Congress has no authority to nullify the acts of the courts." However, he left the door open for filing of briefs. Incidentally this judge is now retired and this appears to be his valedictory.

Evidence of Good Faith

In the U. S. District Court, Western District of Missouri, Judge Ridge ruled that "the advice and opinion of an attorney [retained by the employer] as to the applicability of the provisions of the F.L.S.A. * * * is not in and of itself sufficient to establish 'good faith' of the employer under Section 11 of the Portal-to-Portal Pay Act."

A decision of the New York State Supreme Court, November 4, 1947, held that visits by field investigators and agents of the Wage and Hour Division, and their examinations of books and records, and the subsequent failure of that Division of the Department of Labor to notify the employer of any violations, were not valid defense evidence of "good faith" in his alleged violation of the F.L.S.A.

Compressed Air Text

A REFERENCE TEXT on installation, operation, applications and maintenance of compressed air equipment and air-powered tools of all types has recently been released by the Compressed Air and Gas Institute, Cleveland, Ohio. Compiled to meet the demand for a comprehensive volume of technical data on all types of compressors as well as compressed air tools, the book will also serve the layman and student as a single source for all formerly published trade standards as well as much original material heretofore unpublished. The handbook, of 400 pages, is profusely illustrated and contains many charts and graphs.

Chapter One, "Typical Applications of Compressed Air and Gas," pays tribute to the use of compressed air by the cement industry: "The cement industry is one of the largest consumers of compressed air and probably no industry surpasses it in diversity of application." Special mention is also made of the many uses of compressed air in the quarry. The second chapter deals with the history of air compressors and compressed air in general.

Chapter Three, "Portable Air-Operated Tools and Rock Drills," is of particular interest to the rock products field. The second section of this chapter discusses in detail the uses, limitations and capacities of rock drills and accessories, hand held rock drills and drifter drills, stoppers and classification of rock drills. Also reviewed in this section are rock drill steel tolerances, standard shanks and chuck sizes, drill sharpeners and lubrication, as well as drill testing and water displacement.

The fourth chapter, "Engineering the Compressor Installation for Maximum Efficiency," takes up planning, selecting and installing the compressed air plant, as well as maintenance data. Chapter Five, "Compressed Air Engineering Data and Test Procedure," is chiefly comprised of definitions and tables regarding the various types of compressors and compressed air tools, plus tables on cost of operation.

Compiled over a two year period, the Compressed Air Handbook represents the combined work of 19 member companies of the Institute, working in conjunction with its educational and technical committees.

Diamond Drills In Magnetite

DIAMOND DRILLS in the preparation of blast holes at a large eastern magnetite development has been described as successful in a publication recently issued by the Bureau of Mines. Emphasized were such benefits as greater safety for miners and scraper-operators, recovery of additional ore from pillars and open stopes, elimination of at least one-half of the sub-level development, reduction of primary blasting from once each shift to once in two to six shifts, virtually dust-free drilling and the relatively short time required for training operators in diamond-drilling techniques. Detailed descriptions are given in the publication, entitled "Diamond Drilling Blast Holes, Eastern Magnetite Mine B," Information Circular 7401, which may be obtained free by writing the Bureau of Mines, Department of the Interior, Washington 25, D. C.

COMPRESSOR CAPACITY, cu. ft. per min.	60		85		105		160		210		315		365		420		500	
AIR PRESSURE, lbs. per sq. in.	70	90	70	90	70	90	70	90	70	90	70	90	70	90	70	90	70	90
ROCK DRILLS																		
very light, wet or dry	1	1	2	1	2	2	4	3	5	3	7	5	8	6	10	7	13	9
very light, blower style	1		1	1	1	1	3	2	4	3	6	5	7	6	8	6	11	8
light, wet or dry	1		1	1	2	1	3	2	4	3	6	4	7	5	8	6	11	8
light, blower style			1		1	1	2	1	3	2	5	3	6	4	7	5	9	6
medium, wet or dry			1		1	1	2	1	3	2	5	3	6	4	7	5	9	6
medium, blower style			1		1	1	2	1	4	3	6	4	7	5	8	6	11	8
heavy, blower									2	1	3	2	4	3	4	3	5	4
WAGON DRILLS																		
light weight					1		1		2	1	3	2	3	2	4	3	5	4
medium drifter									1		1	1	2	2	2	2	2	2
heavy drill											1	1	1	1	2	2	2	2

Number of tools that can be operated by various size compressors, taking into account a factor of intermittance which assumes that all the tools are not being operated simultaneously. From Compressed Air Handbook

Change From Single Face To Bench System

Lawrence Portland Cement Co., Thomaston, Maine, changes quarrying methods to permit better selectivity of stone from varying deposit formations. Drilling and blasting practices adopted for more efficient recovery of broken rock

By W. B. LENHART

Looking up to cement plant above quarry. Note haulage units unloading from ramps to quarry cars which are pulled up incline to crushing plant

UNTIL quite recently the quarry of the Lawrence Portland Cement Co., Thomaston, Maine, had been operated from a single face that was roughly 70 ft. high. The broken rock was loaded to industrial cars and hoisted up one of two parallel inclined ramps to the crushing plant. There was no road into the pit and all supplies and equipment had to be lowered via the tracks serving the plant. This, briefly represented the physical conditions under which the operators worked. But far more important to the company were the considerations of quality of the rock and the manufacture of a high quality cement from it at reduced costs, not to mention the need for a considerable increase in tonnage.

James G. Thompson, chief chemist for the Lawrence Portland Cement Co., described the limestone deposit as a "crazy-quilt" arrangement of kidneys of high and low lime materials that do not conform to any set pattern. Churn drill hole records to the 75-ft. horizon, in some instances, show the rock in the bottom to be high-lime. Rock of lower lime content can be present in the middle strata or at the top, or in reverse order. Possibly at the other end of the quarry an opposite condition may prevail. This rock may run from 37 to 56 per cent CaO and is a crystalline, nonsortable material that lies in a folded bed that dips roughly 35 deg. from the horizontal. Operating a quarry from a single face, under such conditions, not only where "rock" was wanted but a *certain* kind of rock must go to the plant had its difficulties, and these difficulties became greater as the pit deepened or was otherwise enlarged.

Shovel starting a cut to change the old, single 70-ft. face into three benches with 22- to 25-ft. faces

Change from Single Face to Bench System

About a year ago the company started to correct these difficult quarry operating conditions, and the plan is now well towards maturity and working so successfully that the goal of approximately 1600 tons per day has been reached, whereas under the old system 950 tons was the average.

To accomplish this end, the operators changed over from a single face to a system involving three benches, each approximately 25 ft. high. One road was built with approaches from the western end of the quarry. A second road is under construction from the eastern end of the pit. Both roads are in the 10 per cent grade range with possibly steeper grades in spots for short distances. This new road is referred to as the "Burma Road."

From these two inclined roads, benches will be worked that can be reached by any of the equipment used in the pit. Further expansion of the quarry can be carried out to the east and some to the west, or to greater depths. The plant cuts off extension to the south and a state highway bounds the north rim. Thus, when the over-all plan is in full operation there will be essentially six working faces all easily approached by the "Burma Road" from which faces an almost infinite amount of selectivity can be obtained. There will be three faces at the east end and three to the west, both of lengths in the 500-ft. range.

Arrangement of quarry before new bench system was started. Note two tracks, to the left, with 10-ton quarry car ready to be loaded. Cars are pulled up ramp with cable

To give still greater flexibility the company purchased a fleet of four Koehring Dumptors, each having a capacity of seven tons, but actually holding eight tons. These units are powered with a 2-cycle Diesel General Motors Co. engine that develops power very rapidly, an advantage when heavy grades are considered. These units have been in successful operation almost a year. Inasmuch as the quarry operates all the year around —and winters are winters in Maine— the company has provided each Dumptor with an enclosed cab and heat for the operator. These carrier units are daily handling stone up to 3-ft. in size.

Mobile Shovels and Compressors

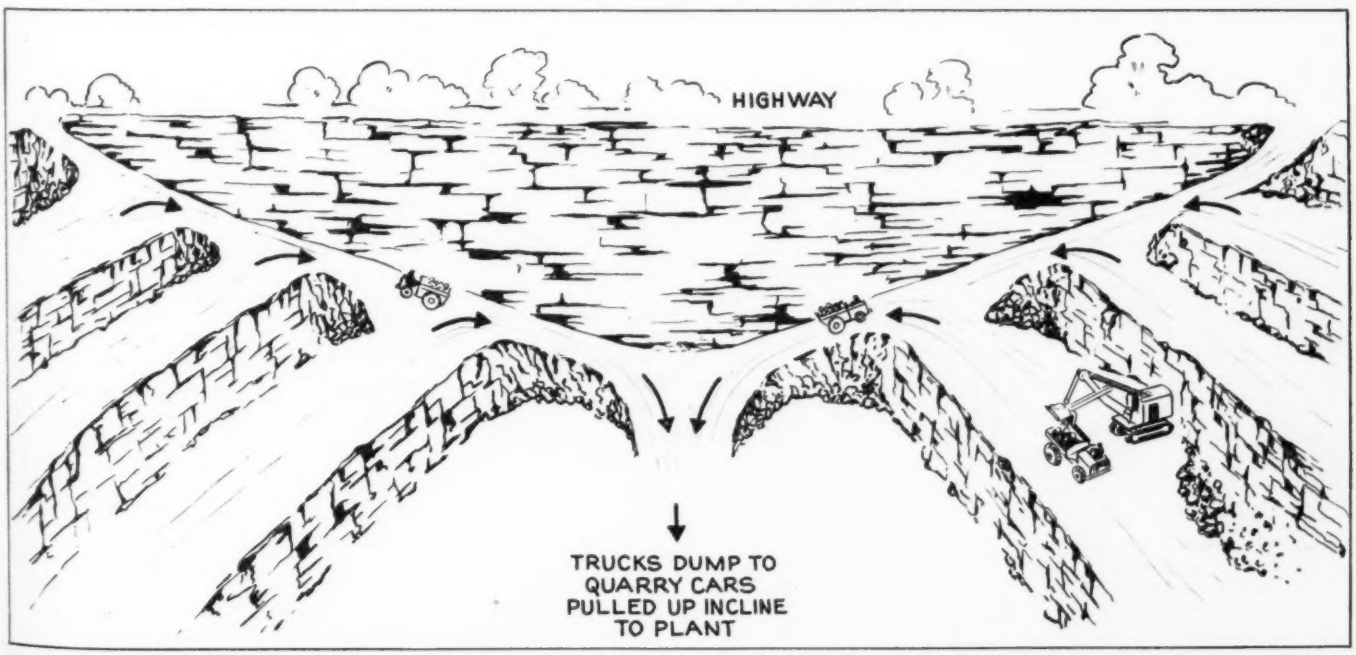
As all quarry equipment has to be able to move from bench to bench in a minimum of time, a new 54-B, Bucyrus-Erie shovel was put in service. This 2½-cu. yd. shovel is powered by a 4-cycle Buda Diesel engine, and can be moved the length of the quarry or from bench to bench in a matter of minutes.

A third requirement was mobility of compressors. Two "Blue - Brute," 500 c.f.m. Worthington air compressors powered by D-13000 Caterpillar Diesel engines were placed in the assembly. These units, mounted on rubber tires, are pulled about the quarry with a D-4 Caterpillar tractor. Portability here is important for it was desired not to have a maze of air lines to cross over, to repair, and to freeze in winter time. When drilling is to be done, one of the mobile compressors is pulled up close to the face with only a 50-ft. length of air hose. When the holes are ready to blast the compressors are moved out by the tractor, but the compressor Diesel engine never stops during the work shift. During secondary blasting the compressors are pulled out of the way and the engine kept running.

For drilling, the company uses four Worthington wagon drills mounted on U. S. Royal rubber tires and also well drills. One of the 500-c.f.m. compressors will operate two wagon drills plus a jack hammer. With much of the quarry equipment mounted on rubber, it is essential to provide a smooth floor on which to operate, bearing in mind that some of these tires cost up to $500 each. To maintain efficient roadways the D-4 Caterpillar tractor and dozer are kept on the job all the time. After a blast all rock is cleaned off the roadways and quarry floor, and while the shovels are loading the dozer runs in from time to time and pushes back the spillage and even assists the shovel by pushing rock to a point that the shovel can more easily reach it. In winter the dozer takes care of the snow problem.

Drilling and Blasting Practices

Introduction of wagon drills along with well drills necessitated a new study of blasting conditions, arrange-



Schematic drawing showing how quarry operation is being changed from a single high face to a series of three benches for more selective quarrying. Note benches on which shovels and trucks operate. All rock is hauled down hill to loading ramps (not shown)

To the left, Wm. Valenta, quarry foreman, and to the right, H. B. Kaler, quarry superintendent

data, and these studies are still going ahead with changes being made in practice as found expedient. However, at the time of inspection all wagon drill holes were either lifters or breast holes or both. These were being drilled with 1¼-in. steel.

Superintendent of the quarry, Harold Kaler, gives the following interesting outline of the company's drilling and blasting practices: "For well drill hole loading, the hole centers range from 12 ft. to 21 ft., depending upon the burden, which ranges from 17 ft. to 20 ft., the type of rock and characteristics of the face. Holes are drilled 5 ft. below the quarry floor. If we anticipate a period of time to elapse between drilling and blasting, we drill an extra 5 ft. or the height of the face plus 10 ft., as we find all drill holes will fill a few feet with dirt and small rocks over a period of a few weeks. When we load, it is quicker and more economical to stem a few feet in the bottom with sand than to bale the hole if it has filled; also this practice assures the full 5 ft. below the quarry floor. In short, the holes are planned to supply the required footage to accept the dynamite load necessary to move and break the rock in the face.

"We use 5- x 24-in., 60 per cent, 40 per cent, and 30 per cent dynamite. The position of the dynamite percentage is always relatively the same with the 60 at the bottom and the 30 at the top, but the percentage amount in each hole varies according to the type rock, characteristics of the face, and the hole.

"We always stagger our deckings and tamp our load with sand if the load is the preferred depth of 20 ft. or more from the top. If it is necessary to bring our load higher in the hole, we use wet clay for tamping. An interesting note here is that we believe top or surface "back-break" can be minimized by keeping the tamping down in the hole and not filling the hole full as in the general practice. This can only be attempted where the load is lower than 20 ft. as we prefer at least that much tamping.

"We use both Primacord and electric caps, depending whether or not the holes are decked. We use one or the other on any one blast, never mixing. We lean toward the electric delay cap, always double-capping the load, but must admit the Primacord has a higher safety factor. It is my practice to load tight or "hemmed-in" faces with the instant caps, in the center; increasing the delay toward the ends or corners, in order to relieve the corners and clean them out. We detonate the caps by using a series circuit hooked directly to a 440-volt line which is available on all faces. Our average load for a single face is 5 tons of dynamite. We use two calculation factors, agreeing with the two principal types of rock in our quarry. For the brittle high lime rock we use 1 lb. of dynamite to 3 tons of rock, and for the hard low lime rock we use 1 lb. of dynamite to 2.8 tons of rock. The figures are used for the fundamental statistics, and the load is, of course, varied by judgment.

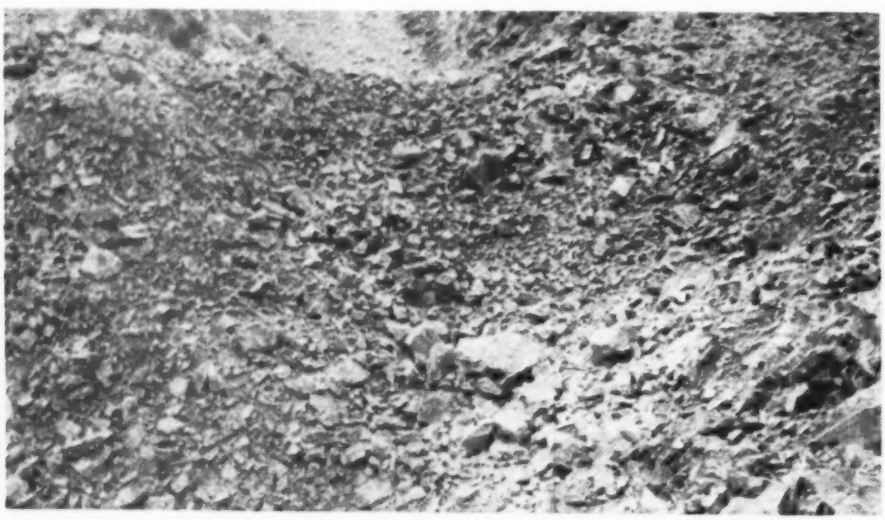
"Our well drilling averages 2½ ft. per hour. We do use cut off holes to direct the breach where necessary. The use of wagon drills on the toe before the blast, totally eliminates excessive burdens at the toe. These wagon drill holes may be blown before or with the blast, depending upon the time available, the load, and the distance from the end of the wagon drill hole and the well drill hole, bearing in mind the possibility of losing a well drill hole by the ground movement initiated by the toe blast.

"It will be observed that we use the wagon drill for secondary drilling on toe; we also use them for primary drilling on a 22-ft. face and plan to use them on 25 to 30 ft. space faces when we start benching operations in the near future. We space our holes 5- to 6-ft. centers on primary perpendicular drilling, however, we find that more economical and satisfactory drilling can be accomplished by horizontal drilling; that is, by setting the drill up in one position we can fan the design and drill six holes without moving the drill, saving considerable time. This system of horizontal toe and breast drilling has been used in many quarries with good results. However, most saving is the steel breakage, as horizontal drilling is in solid rock and perpendicular drilling must start in broken or bottom rock. The broken rock dropping in behind the bit causes excessive breakage and delays, and casing through broken rock is expensive. We try to arrange the shafts so that the ends will be about 5 to 7 ft. apart in the face design. One wagon drill averages 100 to 200 ft. of hole per 8-hr. shift, depending upon the type of rock and difficulties from loose rock.

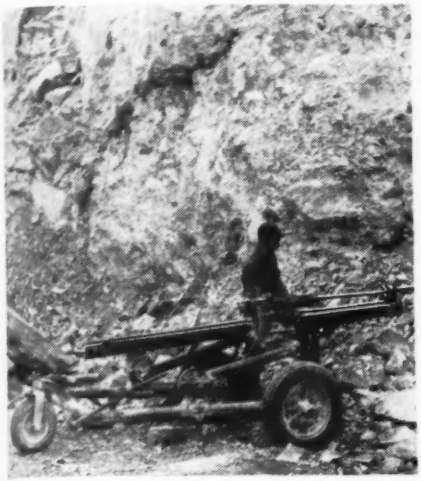
"We use 1½- x 8-in. dynamite and tamp at least eight feet from the face on horizontal and 12 ft. from the top on perpendicular holes. At present we use clay and wet cotton cloth on horizontal and upper-cut holes, but have ordered some 1½- x 12-in. and 2- x 18-in. paper tubes which we will fill with sand for tamping.

"Roughly speaking we use about one stick of 1½- x 8-in. bulky dynamite per foot of wagon drill hole and tamp the balance of the hole. We obtain very good breakage by using 1 lb. of dynamite to 6 tons of rock. Notice that the factor has doubled, cutting the consumption of dynamite in half and almost eliminating secondary jackhammer drilling or squibbing.

"We use instant electric caps on all wagon drill holes, still favoring the



Last blast on "Burma Road." Wagon drills were used in preparation for this shot



Wagon drill operating at the bottom of the face

series connection unless more than 30 caps are used, and then we paralleled two series circuits."

When these operators first started using wagon drills in horizontal holes there was a tendency to break considerable steel near the shank. This possibility is clear when it is pointed out that the strain imposed on a drill shank can increase as the air hammer (drill) rides farther out on its supports. Particularly if there is any slight mis-alignment between the steel and drill, the strain is excessive. They become out of balance so to speak. The drills are provided with a centering device mounted on the outer end of the frame and if properly used this mis-alignment is prevented and the resulting breakage is largely eliminated. Mr. Kaler gives the following drill steel data:

"We use 1¼-in. round Timken steel drills and drill bits. The steel lengths we find most satisfactory for drilling are 7 ft. 6 in., 12 ft., 18 ft., and 24 ft., the number used per hole, of course, depending upon the depth of the hole desired, which generally is 24 ft. These lengths follow very well without changing the position of the drill.

Well drill digging holes for a top bench shot

"We find it more economical to have the worn bits hot milled, retempered rather than grinding them. By hot milled, retempering we get more footage per bit. Our records for the past six months show we drill 84 ft. of hole per bit before it is dull or has lost its gauge. A bit sharpened by grinding will often lose 1¼-in. of gauge whereas a bit hot milled, retempered will only lose about 1/16-in. of gauge.

"We reduce the bit size ⅛-in. on each different length of steel used on a hole. For example, when drilling a 24-ft. hole, we use four sizes of bits. This size reduction tends to speed the drilling and reduces the possibility of jamming a bit in the hole."

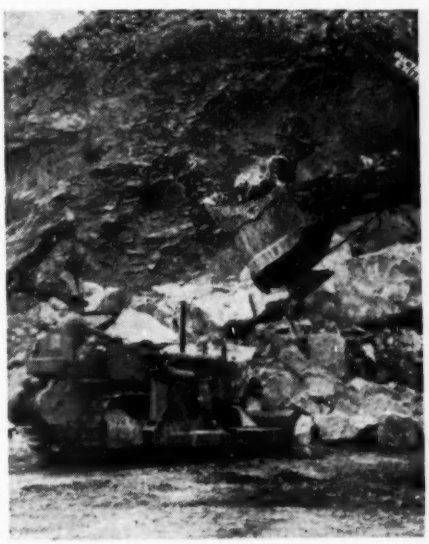
The effectiveness of blasting from small diameter holes more closely spaced can be seen from the illustration as practically all of the rock is small enough for the 42-in. McCully primary gyratory crusher to which it is fed. A Williams Jumbo hammer mill is used for secondary crushing. However, if secondary blasting is needed the company has Gardner-Denver, Sullivan, and Ingersoll-Rand drills available for this purpose.

At this operation it will be noted that all rock is either hauled on a level grade (with the exception of a slight ramp at the transfer station) or down hill. At present there are two inclined ramps (not to be confused with the roads) from the quarry to the primary crusher and 15-ton capacity Easton side dump cars are pulled up this incline to the crushing plant. There is a transfer ramp for each track at present but this is soon to be changed over so that a single loading point approachable from two sides will be used. Thus the Koehring Dumptors will be able to dump from both sides simultaneously.

For repairs to quarry equipment two trained men are on the job. These men secured much of their experience while in the armed services, and are responsible for the mechanical condition of all the equipment. They make daily inspections and keep all records of what is needed, what has been done, and to what piece of equipment, so that in time the owners can see what Diesel engine (for instance) is giving the best results. Once a week Mr. Kaler makes a detailed personal inspection of equipment and as yet he has found nothing that was not already recorded. The mechanics are provided with a mobile repair truck on which is mounted a 300-gal. Diesel fuel supply tank as well as several power driven lubrication guns. This truck makes regular trips to each Diesel engine (Dumptors, shovel, compressors, etc.) and services them on the spot. Graphite grease guns, chassis lubrication and miscellaneous greasing is done by this truck.

(Continued on page 127)

Electric shovel loading haulage unit on lower level



Bulldozer pushes broken rock within range of shovel and helps to keep quarry floor clean

Close-up of haulage unit dumping to quarry car

Sand Separation

Solving the Problem of

LITTLE GRAVEL—MUCH CLAY

By NATHAN C. ROCKWOOD

A PRODUCER POSES the following problem: "For the past several months we have been dry screening sand and gravel, and are now contemplating installation of a small washing and screening plant to process about 20 tons of material an hour. Our deposit consists of fine sand and small size gravel, and this material is now screened through a 1-in. mesh cloth on a single-deck vibrating screen.

"The excavation and scalping screening operation at present is dry and it is the minus 1-in. material we wish to transport to the washing plant at a rate of about 20 tons per hour. A rough screen analysis of our raw material is about as follows:

Through 1-in. mesh	.....100%
Through ½-in. mesh	..... 90%
Through ¼-in. mesh	..... 86%
Through ⅛-in. mesh	..... 80%
Through 1/16-in. mesh	... 40%
Through 100-mesh	...10 to 15%

"The material contains some loam and a diversity of clay, which at times runs as high as 10 to 15 per cent of the total. The clay balls up during screening and we have found that the use of a flume, or water sprayed on the screen, will not disintegrate these clay balls.

"As a start of the washing operation we would like to produce washed gravel up to 1-in. size and two sizes of sand, minus ¼-in. and minus ⅛-in. Our chief problem seems to be that of separating the ⅛-in. clay balls from the ⅛-in. sand and the ½-in. clay balls from the ½-in. gravel, etc. We are asking your opinion as to what type of equipment we could install to make the separation and give us clean sand and gravel.

"We are interested in your comments relative to the use of a log washer, a scrubber with balls, or what. We should like to see answers to these questions:

"(a) If a ball-mill type of scrubber is used, would it be possible to feed the scrubber with sand and gravel, or would it be necessary to first screen the sand from the feed?

"(b) If it is necessary to screen out the sand from the feed to a log washer or scrubber, how could the sand be cleaned?

"(c) What size log washer or scrubber would be required to do the job?"

Scrubbing First Requisite

From the operator's description, this material obviously contains too much clay and too little gravel to be cleaned by transporting the raw material from pit to plant in a flume with water, or to wash on a vibrating screen with any amount of water that could be applied through sprays. Long flumes will often do a good washing job where plenty of water is used and there is enough gravel to do the scouring. But in this case 10 per cent of plus ½-in. gravel is not enough.

Some kind of a scrubbing device must therefore be installed — some type that supplies plenty of agitation and scouring. There are three general types, any one of which would probably do the job provided an ample supply of water is available. From data gathered by the late Edmund Shaw, an authority on washing and hydraulic separation subjects, a sticky clayey sand and gravel may require as much as 7 g.p.m. per cu. yd. per 10-hour day. Thus to wash approximately 200 tons (including the gravel), or about 135 cu. yd. of material might possibly require 1000 g.p.m.

Since a more liberal estimate of 150 cu. yd. per 10 hours is $\frac{150}{10 \times 60} =$ 0.25 cu. yd. per min., or 6.75 cu. ft. per min., and 1000 g.p.m. is 134 cu. ft. per min., this is 20 volumes of water for one volume of sand and gravel, or a dilution of 20 to 1. Admittedly, this is a large volume of water for the tonnage to be treated and it is entirely possible that the job could be done with not more than 500 g.p.m., if the clay is not too difficult to get rid of. The actual amount would have to be determined by experiment and/or experience. In ordinary sand washing and separation by hydraulic methods the proportion of water to sand (loose volume) is usually about 6 to 1.

Kinds of Washers

There are at least eight types of sand and gravel washing devices: (1) jet washers; (2) sluices; (3) moving screens; (4) log washers; (5) screw washers; (6) cylindrical or conical scrubbers; (7) rakes; (8) drags. The first two, jet washers and sluices, probably would not do with such sticky clay; indeed sluicing has been tried and abandoned in this case. A revolving cylindrical or conical screen is a satisfactory scrubber if there is sufficient good sized gravel, but evidently is of questionable value in this case where 90 per cent of the material is minus ½-in.

Some one has suggested to this operator the use of a rotary screen or scrubber with iron or steel balls, evidently to take the place of the missing gravel. Such a screen or scrubber would require a screen ring or diaphragm at the discharge end to retain the grinding or scrubbing media. Incidentally, a few pieces of large gravel

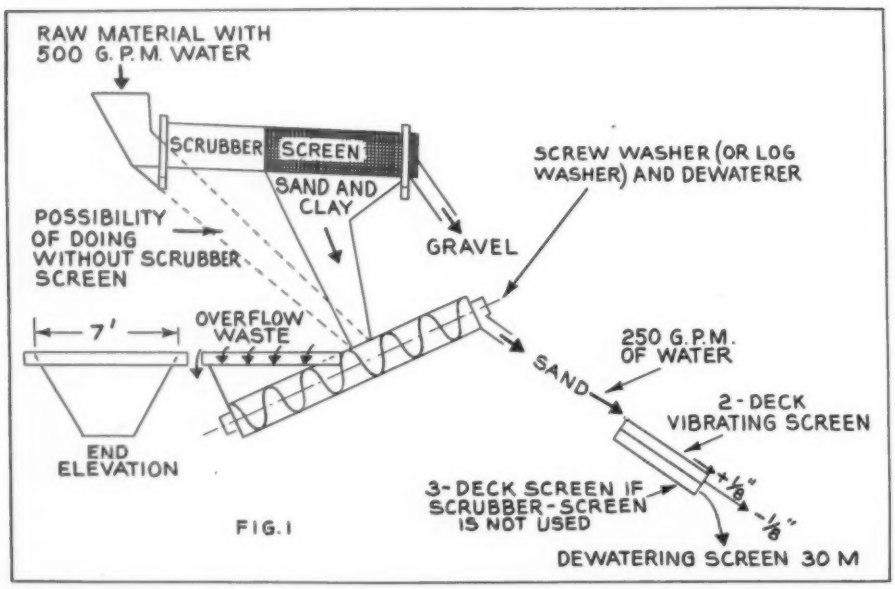


Fig. 1-A: Scrubber and screw washer installation for removing clay from sand and gravel

or boulders would serve the same purpose as iron balls. A similar type of scrubber is equipped with chains to furnish the necessary scrubbing medium. Such a scrubber at the feed end of a cylindrical or conical screen which has 1-in. perforations in the main barrel and a jacket with ⅜-in. or ¼-in. perforations would probably prove a satisfactory solution of the problem presented here. There are various kinds of scrubber and rotary screen combinations which the operator should investigate. A relatively small commercial size should be sufficient to handle 20 tons per hour; say a cylindrical scrubber-screen combination of 30-in. diameter, 14 to 16 ft. long, or an equivalent conical scrubber and screen unit.

In answer to the operator's question (a) we would say that it would be preferable not to separate the feed into sand and the gravel, regardless of the type of washer used. The gravel helps in the scrubbing action. We doubt that a standard type log washer would prove satisfactory. This type of washer is designed primarily for gravel and crushed stone, and in this case would discharge only about 2 tons per hour of plus ½-in. gravel, leaving all the sand to be recovered and cleaned by some other device. It is possible there are specially designed log washers that would do the trick. Evidently, however, it is a screw washer that is called for here—probably a standard 15-in. screw with a 2- x 12-ft. tank would handle the 20 tons of sand and gravel, but its water capacity probably would not be over 300 g.p.m. If it proves necessary to use more water a specially designed settling tank, as described later, would be necessary.

The size of screw and tank to be selected, therefore, hinges on the amount of water required to do a thorough job of washing and sand separation, and the limiting size of the fine sand to be recovered.

Assuming that thorough washing and removal of clay can be accomplished with 500 g.p.m. and that it is desired to recover 20 tons per hour of sand and gravel and waste 2 tons of clay, the main consideration is to determine the overflow velocity of the tank or settling basin, which may or may not be a part of the screw washer. The feed is approximately 74 cu. ft. per min., of which 67 cu. ft. is water, approximately 1 cu. ft. is clay and loam and 6 cu. ft. is washed sand and gravel discharged with approximately 35 per cent water, or the product discharged is 8 cu. ft. and the waste overflow is 66 cu. ft. per min., or 1.1 cu. ft. per sec.

We believe the best results would be obtained with the installation of both a scrubber-screen and a screw washer, as shown in Fig. 1. However, if the operator, or an equipment manufacturer, wants to try washing without the scrubber, the raw material could be fed direct to the screw as shown by the dash lines. In this case it would be necessary, of course, to screen out the gravel following the screw washer, which could be done on a scalping screen, or probably on the top deck of a 3-deck vibrating screen. If there is doubt as to the ability to make the separation into two sizes of sand on a vibrating screen, a hydraulic separating device could be substituted for the two lower decks, as described later in this article. In the design sketched in Fig. 1, the length of the screw, in our opinion, would be governed by the amount of dewatering it is intended to accomplish, as well as by the amount of scrubbing and washing that may be necessary.

Determining Size of Tank or Container

According to Shaw's booklet on "Sand Settling and Devices for Classifying Sand," the average free falling rate of a particle of sand between 100- and 120-mesh size is 0.54 in. per sec. in clear water. In clayey water, such as in this case the rate would be at least 10 per cent slower, so for the sake of simplicity and in the absence of specific data on the falling rate of the sand in question (which should be determined experimentally) we will assume the falling rate or velocity is 0.5 in. per sec. for the smallest particles it is desired to save. At this point we do not know the length or depth of the overflow weir—and these determine the overflow velocity. However, from experience we can assume that they must be such as to keep the horizontal velocity down to one which will permit the 100-mesh particles time to settle say to 1 in. in depth.

This requires 2 sec., so the horizontal velocity must be determined by certain preliminary assumptions as to the dimensions of the tank, or the depth of flow over the weir. The quantity of water flowing over a weir is determined by the Francis formula as explained in ROCK PRODUCTS, September, 1947, p. 90, and June, 1947, p. 102. The formula is:

$$Q = \tfrac{2}{3} C \sqrt{2g} \times L \times H^{\frac{3}{2}},$$

where Q = quantity in cu. ft. per sec.
C = A constant usually about 0.64 for sharp-crested weirs
g = Acceleration due to gravity, 32.2 ft. per sec.
L = Length of weir in feet
H = Head (or Height) of water over the weir in feet

We know from previous experience that a head of approximately 0.05 ft. (a little more than ½-in.) is about right, so our problem is to determine the length of the weir when its depth is 0.05 ft.

The formula, transposed, becomes

$$L = \frac{Q}{\tfrac{2}{3} C \sqrt{2g} \times H^{\frac{3}{2}}} = \frac{1.1}{0.42 \times 8 \times 0.016} = 20 \text{ ft.}$$

This could be a rectangular box, say 7 ft. square, with overflow on three sides, or a circular tank of an approximate diameter of 6½ ft., with overflow around the entire circumference. The overflow would be waste water with the 10 per cent of clay and loam. Whether this tank should be a part of the screw washer, or a separate unit, would be optional on the part of the equipment manufacturer, but the screw, or a pair of screws, would provide a satisfactory method for continuous discharge, if the tank and outlet were properly designed to provide such a long overflow weir.

The velocity over the weir, which is of course also the velocity of approach is $V = \frac{Q}{A} = \frac{1.1}{20 \times 0.05} = 1.1$ ft. per sec. Therefore, in order to give a 100-mesh particle time to fall nearly 1 in. would require 2 ft. In other words a particle must have space to travel 2 ft. in any direction to reach the overflow crest. The 6½-ft. cylindrical tank would thus provide ample room for the required surface velocity with 500 g.p.m. if the feed were introduced correctly. A rectangular tank might be 3 x 9 ft., with weirs on both sides and the end, for example. If this proved to retain too many fines the end 3-ft. weir might be shut off by a movable flash board, or a part of the side weirs, or of course the amount of water could be increased and the velocity thus increased. It is better to start with too large a tank and too much weir, which can readily be shortened by flash boards, than with too small a tank. If the water required is less than 500 g.p.m., the same tank can be used to recover the same minimum size by shortening the weir.

If a combination of scrubber and rotary screen is selected, the minus 1-in. plus ¼-in. clean gravel would be recovered separately from the ¼-in. jacket screen and the sand, water and dirt could go to any overflow settling tank designed with approximate dimensions as outlined above. Some method of drawing out the clean settled sand would have to be installed; a cone-bottom with a float valve might serve the purpose, as in numerous commercial sand recovery devices.

In this case of the sand-settling device following a scrubber, the design of the classifier could readily be made to include two units, one to overflow the minus ⅛-in. size and the other the minus No. 100. It would be merely a problem of obtaining the right weir lengths and overflow velocities for the two sizes, as described further on. Since only 6 per cent of the feed material is between ⅛- and ¼-in., the compartment for separating the minus ⅛-in. from the clay and silt

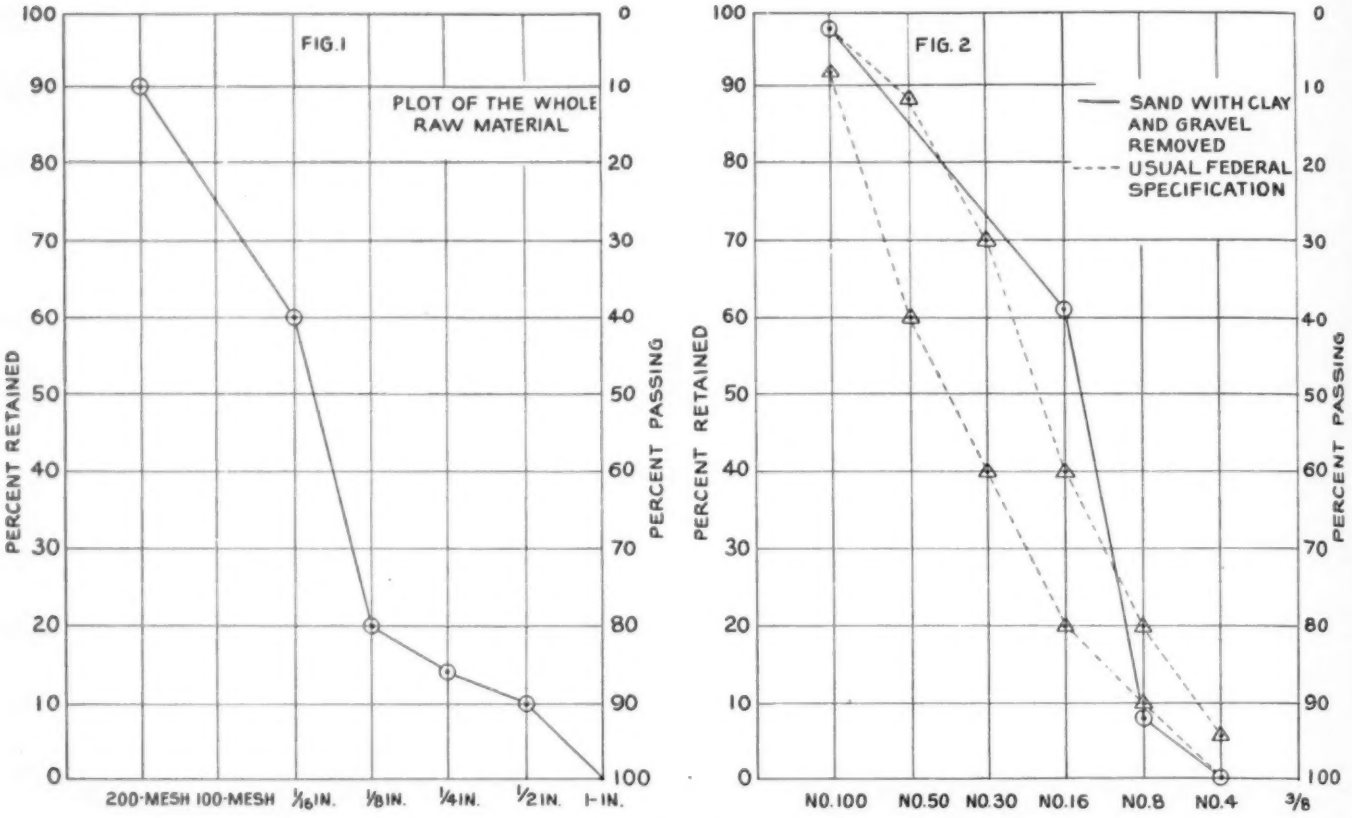


Fig. 1: Showing gradation of raw material. Fig. 2: Curve of screen analysis showing an excessive amount of sand passing the ⅛-mesh

would have to be almost as large as the first calculated 7 x 7 ft. with a weir length in the neighborhood of 20 ft., possibly 6 x 6 and 18 ft. would suffice. The first settling device to separate the plus ⅛-in. would be designed for particles with a falling rate of about 12 in. per sec. Therefore, using the 500 g.p.m. as in the other calculations and a velocity of 3 ft. per sec., which would give a plus ⅛-in. particle time to fall 4 in., the area of flow (length × depth on weir) would be

$$A = \frac{Q}{V} = \frac{1 \text{ cu. ft. per sec.}}{3 \text{ ft. per sec.}} = \frac{1}{3} \text{ sq. ft.}$$

If the depth over the weir is 1 in. or 1/12 ft. the weir would have to be 4 ft. long.

Other Types of Washers

As to the possibility of a rake or a drag, this type is primarily a classifying and dewatering device, and probably would not provide enough scrubbing action to get rid of the clay balls. However, if a manufacturer of such a device is willing to guarantee its performance for this work, there of course is no objection to giving it a try. It could be used satisfactorily to give the final finish wash and to dewater the sand, where the scrubber has been installed in advance of it—that is a drag could be used in place of the screw in Fig. 1 in connection with a scrubber-screen.

Sand Separation into Two Sizes

The final problem remains of separating clean sand into minus ¼-in. plus ⅛-in. and minus ⅛-in. If the clean sand and gravel has been recovered as a whole from the screw washer, the separation into minus 1-in. plus ¼-in. gravel, and into the two sizes of sand probably could be accomplished with a three-deck vibrating screen. The top deck with ¼-in. mesh would reject the gravel and pass the sand. The second deck with ⅛-in. square mesh or ⅛- x ½-in. rectangular mesh, or possibly 3/16- x ½-in., would screen out the plus ⅛-in., and pass the minus ⅛-in. To accomplish this successfully the feed to the screen should be diluted with about 250 g.p.m. of clean water (about a 6 to 1 dilution, loose volume). If the gravel has already been separated in a scrubber-screen, the third deck could, using say a 30-mesh screen, be the means for dewatering the fine sand. Otherwise the minus ⅛-in. sand would have to be dewatered in some other device, possibly merely by binning or stockpiling.

Or, if the operator prefers, the separation at the ⅛-in. mesh size could be made in some simple hydraulic device, such as a rising current classifier. Using 250 g.p.m. (35 cu. ft.) of water and 6 cu. ft. of sand, the classifier would have to be designed to overflow the minus ⅛-in. and retain the plus ⅛-in.

As already noted the falling rate of a ⅛-in. particle is approximately 12 in. per sec., so if it is desired to separate the plus ⅛-in. from the minus ⅛-in. in a rising current classifier, the rising current would have to be less than 1.0 ft. per sec., which, theoretically, would just keep this size in suspension. We will say 0.9 ft. per sec. would allow the ⅛-in. to settle. With this clean sand mixture a 6 to 1 dilution would be sufficient; this is 30 cu. ft. of water to 5 cu. ft. of sand per min. This is about 0.5 cu. ft. overflow per sec. We then would require a cross-sectional area of 0.55 sq. ft.; hence, for a velocity over a weir to balance the rising current velocity of 0.9 ft. per sec., would require a weir 12 ft. long, or say a cone with a rim overflow 4 ft. in diameter for an overflow depth (head on the weir) of 0.05 ft., with a sorting column below having a diameter of approximately 1 ft.

Sand Analysis

A plot of the screen analysis of the material (Fig. 2) shows that there is an excessive amount passing the ⅛-in. mesh, and not enough passing the 1/16-in., to make a good concrete sand. A plot of the sand alone with the 16 per cent plus ¼-in. and the clay removed is compared with the usual Federal Government specification in Fig. 3. In a future issue we will discuss how the producer may combine two fractions of plus ⅛-in. and minus ⅛-in. in proportions to provide a good concrete sand.

The writer's purpose in publishing this operator's problem and his suggested solution is to invite discussion.

Additive Feed Rate Calculations For Air-Entraining Cements

By C. J. KNICKERBOCHER

AIR ENTRAINING potential of air entraining cements is calculated during manufacture by means of a laboratory mortar air content determination. It is controlled within the desired limits by adjusting the amount of air entraining agent added to the cement. The agents are added in either a liquid or dry state, and several methods are employed for introducing into the grinding units. The means of adjusting the rate of feed varies with the manner of addition.

A method is herewith described, employing graphs, for correcting the mortar air content by means of adjustment of the agent feed rate. A weight or volume of agent is chosen which will entrain the required amount of air when added to a known cement production. The amount of agent should be such that it will correspond to the average value of the timing range chosen. As an example, a feed timing range of 10 to 20 seconds is chosen and the amount of liquid agent required for the average production rate anticipated is calculated as being 200 ml. in 15 seconds. Since a constant volume of agent will be used as the control measure, the subsequent amount of air developed for a given production rate will vary inversely with the time in which it is delivered into the grinding units.

It will be noted that any volume or weight of agent may be used as the control measure, only the amount must be such that it will entrain the average amount of air required when fed at the average of the timing units given in the graphs.

The graphs are constructed from the equation:

$$T_1 = \frac{T}{1 \pm \frac{A - A_1}{A}}$$ where,

A is per cent air determined by test of cement mortar.
A_1 is per cent air desired.
T is time in seconds corresponding to A.
T_1 is time in seconds corresponding to A_1.

Example of use of Graph 1:
$A = 13$ per cent
$A_1 = 16$ per cent
$T = 15$ seconds
$T_1 = ?$
Calculation:
$T_1 = 15/(1 + (3/13))$ or 12.2 seconds.
Graph 1: Move vertically from A to A_1, horizontally to T, vertically to 12.2 at T_1.

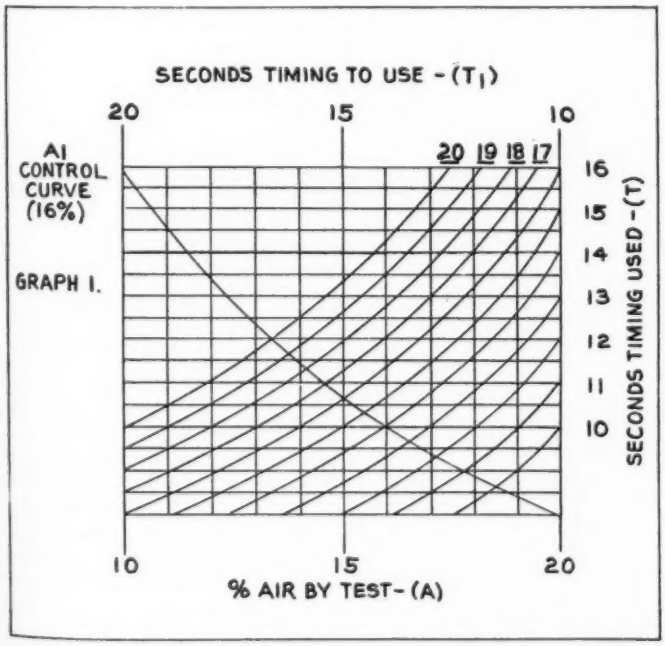
Example of use of Graph 2:
$A = 25$ per cent
$A_1 = 22$ per cent
$T = 15$ seconds
$T_1 = ?$
Calculation:
$T_1 = 15/(1 - (3/25))$ or 17 seconds.
Graph 2: Align 25 at A with 22 at A_1, pivot on diagonal, align 15 at T with 17 at T_1.

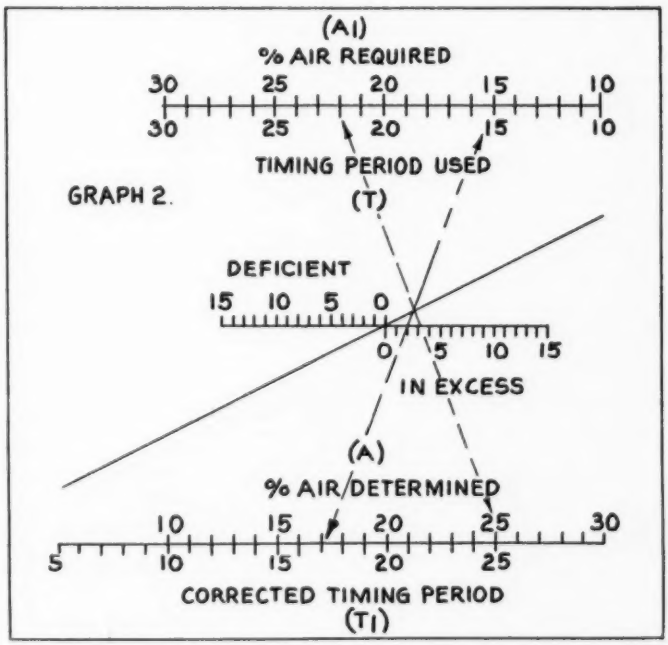
Graph 1 is constructed particularly for use in control during manufacture of Type 1a cement. The mortar air content control is fixed at 16 per cent, the mean of the values of the specification range. The required solution movement is as follows: enter graph at A, move vertically to control curve A_1, move horizontally to curve T, move vertically to desired value at T_1.

Graph 2 provides a wider range of mortar air content and timing control values than does Graph 1, and is suited to use during manufacture of both Type 1a and masonry cements. The required solution movement is as follows: align values at A and A_1 with a straight edge, holding point of crossing the diagonal. Align value at T with diagonal crossing point and read required value where extended line crosses T_1.

Record Cement Shipment

BRAZIL WILL BE the recipient of one of the largest cargoes of cement to be shipped from Philadelphia, Penn., in many months. Carried by the Rio Dale, a Norwegian vessel, the 101,000 bags of cement were to be unloaded in amounts of 26,000 bags at Santos, 35,000 at Rio de Janeiro and 40,000 at Bahia.





Graph 1: Method of correcting the mortar air content by means of adjustment of the agent feed rate. Move vertically from A to control curve; move horizontally to T curve; move vertically to T_1; read new timing period. Graph 2: This graph provides a wider range of mortar air content and timing control values than Graph 1, and is suited to use during manufacture of both Type 1a and masonry cements. In using, align values at A and A_1 with a straight edge, holding point of crossing the diagonal, then align value at T with diagonal crossing point and read required value where extended line crosses T_1

Fuel Economies In FIRING LIME KILNS

First of a series of articles covers the subject of mechanical gas producer systems

By VICTOR J. AZBE*

ANY INCANDESCENT FUEL BED is a gas producer, therefore, the production of gas has been practiced since fuel has been burned. Separate units, however, with the distinct purpose of producing combustible gas, to be burned at some later moment have a history which exceeds one hundred years. In the industrial world this is a long period during which innumerable designs have been evolved, operated, and abandoned. It would seem that there would be little opportunity left for further development, particularly as there are now good, large, high capacity, extensively mechanized gas producing units of many makes available. In spite of this there is still a lack of entirely suitable producers for certain purposes.

There are large mechanized units of high capacity on the one hand, and small, crude hand-worked producers of low gasification rate on the other. There does not seem to be anything simple and satisfactory developed in between. Very often neither one nor the other is adaptable for either one reason or another to the purpose at hand, leaving the industry severely handicapped in the proper and efficient application of heat. In view of this, there is a very definite need for a range of gas producers of lower capacity and lower cost than those of the large mechanical units of today. Such machines should be mechanized in a degree but so simple that a breakdown in any mechanical part will still permit continuation of operation by hand-operated means.

The best gas application is generation integral to the gas consuming units, obviating the necessity of using long, costly, trouble creating gas mains, which are responsible for a considerable heat loss, irregularity, and high operating cost. With large high capacity producers in almost all cases, gas mains, often very long gas mains, are a necessity, which brings on the nightmare of soot and the resultant frequent interruptions required for its blowing and disposal. But even though soot is regularly and frequently removed from the mains its deposit in any extent still varies the gas main resistance to flow and very likely varies the amount of hot gas delivered to the respective gas consuming units connected to the main. While it may seem that regulation would care for the distribution, proper regulation of hot producer gas and its distribution between several units connected is a most difficult matter.

By contrast, in case of the integral operation, soot can readily be blown out of the small short connection back into the producer where it is burned off, thus virtually completely disposing of this nuisance without any operational interruption. Regulation of integral operation is very definite; even automatic control is possible since rather than aiming at control of the hot gas which is impossible, the cold air volume supplied to the producer is controlled.

The gas producer developed by the writer was designed purposely for such integral operation but of course it is not limited to it. It may be connected to several gas using units if desired although then the many advantages of "integral" operation are lost. However, as integral operation is greatly desired, the producer design is unitized, a single unit presenting a 25 sq. ft. area but if desired a triple unit may be selected of 75 sq. ft. area.

Conventional gas producers of the large, fully-automatic type are admirable machines but suffer certain inherent and unavoidable faults.

1. In some types of gas producers, air is introduced through a cast iron mushroom which fails to properly dis-

*Azbe Corporation

INTRODUCTION

HAND-FIRING has no place in any operation today, whatever it may be, a lime kiln or any other combustion apparatus. Increasing costs of fuel and labor decide this as well as the fact that any apparatus which is hand-fired tends to be of low capacity which multiplies costs and is otherwise inconsistent with today's industrial tempo.

Oil, mixed feed, natural gas, producer gas or pulverized coal firing have largely superceded hand-firing. Oil is becoming too costly and there also is the promise of increasing scarcity. Pulverized coal application is in the state of promising development and is likely to become entirely practical for certain types of vertical kilns. Natural gas is the ideal fuel when available but the ever increasing demand by domestic users causes mid-Winter scarcities and plant operational interruptions. This proves highly upsetting to the lime manufacturer as well as to the consumer obtaining lime under contract.

There is the system of mixed feed firing with "Pot Kilns." They can be crude, but when improved they are quite satisfactory and, for some operations, the most desirable.

Many plants are being converted to producer gas firing, and there would be more if suitable producers were available. A small plant can hardly justify a large, fully-automatic producer, and in large plants such producers present soot and control problems that seem impossible of entirely satisfactory solution.

In this series of articles, we will deal with all of these systems as well as with their combinations; such as, alternate firing with natural gas and oil, or producer gas, if one of these fuels becomes unavailable. Even combination firing of two fuels at a time, which is also possible and at times advantageous, is dwelt upon.

The first of the series is devoted to the gas producer. Discussion centers around whether or not the plant should consist of several kilns connected to a central gas producer of the fully automatic type as shown by Fig. 1, or, of the integral type with each high capacity kiln having its own producer as shown in Fig. 2.

The integral, deep-fuel-bed producer relation to the kiln is presented in Fig. 3.

The writer has installed quite a number of successful fully-automatic producer gas plants, as well as integral producers. It is plain to see that preference is shown toward the integral type but not completely so. For small plants it is the integral type quite definitely but in large plants it still is very much a question.

tribute air over the entire cross-sectional area of the gas producer. Therefore, for this as well as still other reasons, not all of the vertical sections of the producer perform alike. Some produce much hotter gas than others. In some sections gasification rate is much higher than in others. Due to this variability, temperature in one section may be higher, tending to localized clinker formations, while from another section, a poorer, hotter, or sootier gas may be evolved.

2. The ash bed in the case of all of the above producers is out of necessity very thick, from 18 in. to 2 ft. above the top of the mushroom and several feet below. All air must be blown through two feet or more of fine, high resistance ash. This is necessary to insure a fire never reaching the mushroom tip as it may readily and rapidly be damaged. But it creates considerable resistance to air flow, which may not be at all constant, as the ash bed at one time may be considerably more compact than at another, or at one point compared to another even when it is measured and thickness may be the same. Rather frequently ashes may be removed without any change in the height of the ash bed, the removal resulting in just the loosening of the bed.

3. Ash removal is not definite. More may be taken from one section than another, causing an uneven and unlevel ash-fuel lime level. There always is a problem of how to maintain the ash bed level.

4. When clinkers are formed they are very difficult to work out of the bed. Even at the best it takes a long time to do so. From a day to two or three days for them to just pass through the portion of the ash bed through which the air is being forced, and so once formed they interfere with proper ash removal and except they are laboriously dug out may float around for many days. With clinkers presenting so much trouble the aim is to avoid them at all cost; that is, the producer is operated with a relatively cool oxidizing zone, which however, tends to production of poorer gas and limits capacity of the producer.

5. All mechanical producers of the stirring or leveling bar type operate with a very thin active bed seldom any thicker than 12 in. When such producers are operated at high capacity, time of contact is so short that (except where gasification temperature is very high) reduction of CO_2 and H_2O to CO and H is low. If a high oxidation and reduction temperature is maintained then clinkering is more likely to take place.

6. Ordinary producers of thin reaction bed type give a gas of high temperature due to low conversion of H_2O, a lower amount of reduction of CO_2 and partially also due to greater likelihood of blow holes developing, especially at the walls around the edges of the bed. High gas temperatures are conducive to formation of greatly increased amounts of troublesome soot.

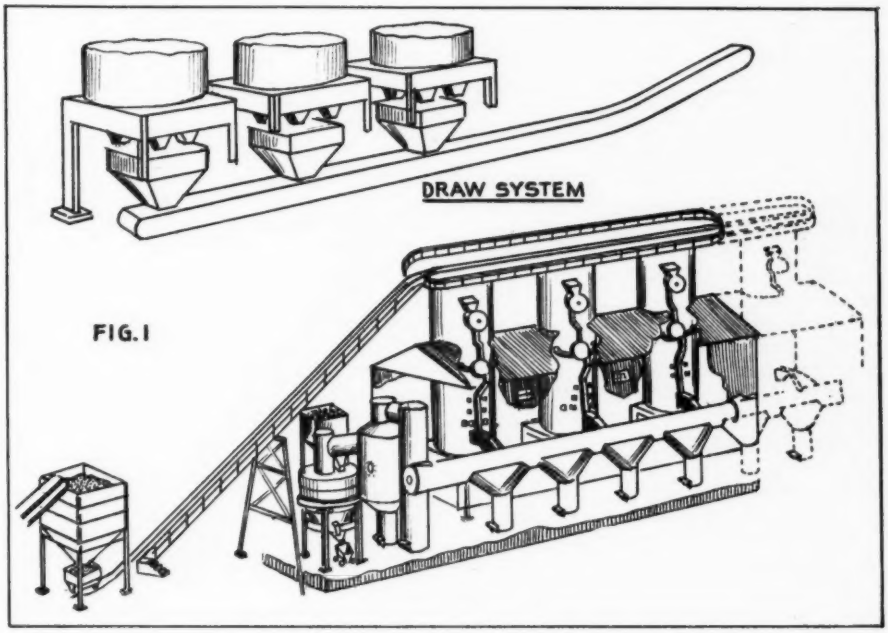


FIG. 1

Fig. 1: Central gas producer of the fully automatic type

7. Such producers are always mechanically complex and not at all simple to operate. Exceptional men are necessary to be able to visualize what is taking place and to be able to foresee what needs to be done. When there is trouble, considerable experience is needed to get out of it and few men have it in adequate degree. When trouble is serious it means a shut down, which ordinarily may be short but can also be long. There is no such thing to them as hand operation to continue gas production until the mechanical fault is corrected.

8. Most of such gas producers need circulating water, which requires auxiliary equipment. With this comes corrosion and scale problems and the likelihood of development of leaks in the water jacketed surfaces and stirring bar systems.

9. While such producers are "mechanical" still due to their complexity they require too much attention for a mechanical device. Even the ash removal and disposal is not a simple matter. As a result the producer is not operated by the process man, but a special gas producer man is required, increasing the operational cost by at least $10,000 per year.

10. Such producers have a high potential capacity, but the maximum is seldom ever attained through limitations brought on by fear of clinkering, by the high resistance of the too frequently compacted ash bed and by various minor interruptions caused by the multiplicity of complex mechanical items. While the rated capacity may be listed at between 50 and 75 tons of coal gasified per day, the actual capacity seldom exceeds 40 and very often not that much.

By contrast the gas producer illustrated, is designed more simply and in many respects is of greater effectiveness. It could be called an "Integral Producer" because it is so readily directly connected. It could also be called a "Thick Fuel Bed Producer" which increases its effectiveness.

As it lacks the stirring or leveling bar not as high a gasification capacity is claimed for its projected grate area. However, the area is considerably cheaper. Lack of a fuel leveling device is of little importance as the bed thickness maintained is rather high combined with the general arrangement of clear height, oblong shape and its relation to the fuel distributing arrangement. It fails somewhat with badly caking coals by not having a stirrer when maintenance of higher gas temperature becomes necessary, but that is its sole point of failure. It does reduce capacity to an extent and invites the use of more free burning fuels.

The Azbe producers may be obtained for either manual or mechanical operation, with the possibility of operating the mechanically arranged producer by hand, if that for any reason becomes necessary.

Operating Details of Producer

The following advantages are claimed for this type of producer:

1. Air is introduced through plain shaking and dumping grates. One would possibly think that this is too simple an approach, but there is no better arrangement for more uniform air introduction than flat grates, every section of the bed obtains its air relatively unimpeded from below and when ashes are removed in the shaking, the ash bed is loosened all over.

2. As the grates lay horizontal, not projecting upward as in the case of

the mushroom grate, ash thickness required is at the minimum. When the ashes are drawn only an inch layer over the grates is necessary. The high resistance of the heavy ash bed is eliminated, and also the factor of variable resistance through differences in packing. While mushroom grates may be burned if the ashes drop unduly, this is unlikely to occur even though the fire comes to lay directly on the flat grates.

3. Ash removal is definite. There are from two to eight sections of grate depending on the size of the gas producer. When drawing ashes the grates are mechanically shaken until a glow appears in the pit and a uniform ash bed prevails. As this operation is mechanized, it is readily and quickly accomplished. Ashes can be shaken out frequently, thus virtually completely eliminating them as a factor of resistance or variability. Removal of the ashes from the pit can take place once a day for which a screw conveyor is provided. Discharge may be on to a truck for immediate disposal thus solving the ordinarily rather vexing ashing and ash disposal problem.

4. The producer is conveniently equipped with small, tight, heat-resisting clinkering doors leading to the bed immediately above the grates. Even if the producer becomes tightly clinkered, through these doors all of the clinkers could be broken up as well as removed within half-hour.

5. Through the low ash bed and for other reasons of design, a very thick fuel bed becomes possible, from four to as high as seven feet if desirable. This permits more reliance on thickness of the bed than its temperature for reduction, and higher steam and carbon dioxide dissociation will be attained, closer to the equilibrium of gaseous reactions. By virtue of the thick bed straight feeding of coal without leveling devices becomes possible.

6. Due to the heavy bed, blow holes are unlikely and in addition due to the more complete reduction, gas temperatures are relatively lower. There is less cracking of the heavy hydro-carbons, there is less soot and the gas when burning has a greater luminosity.

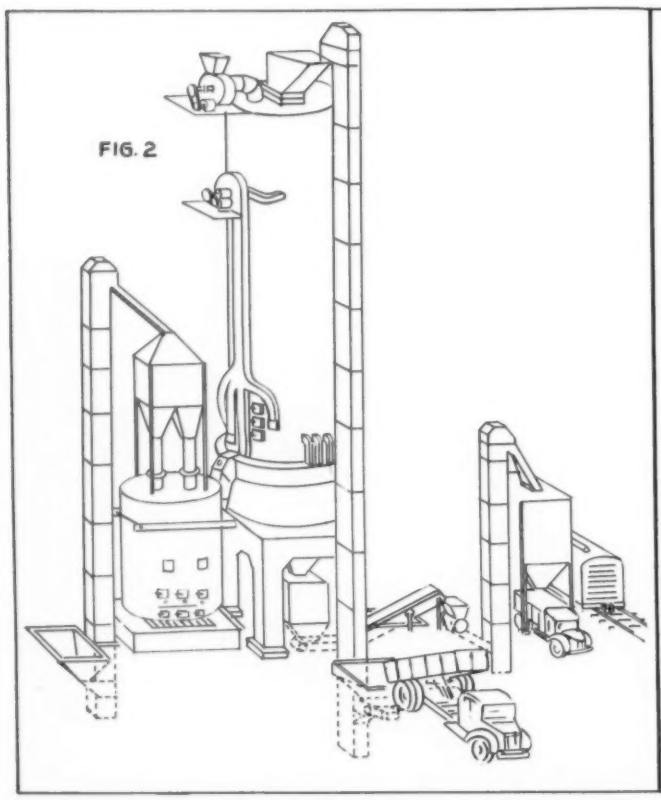
7. The positive ash removal, the ready removal of clinkers, if accidentally formed, together with the thick fuel bed would permit application of the producer to special processes. For example, for gas of low sulphur content for critical metallurgical operations. In such cases some lime would be fed with the coal to the producer. This lime would absorb much of the sulphur from the gas coming up through the bed. This of course would lower the clinkering temperature of the ash, but the endothermic agent, either steam or carbon dioxide, could be increased, and due to the great thickness of the bed a good gas made.

The producer would also lend itself well to production of gas from coke, using oxygen rather than air. In this case the blast would be saturated with vapor to a much higher level which would be permissible as high steam reduction would be obtained due to the exceptional fuel bed thickness. If the producer should occasionally become clinkered, except for a relatively short interruption, it would not matter. The thick fuel bed would also be of value since coke is a less reactive fuel.

8. Originally this producer was built with a water sealed ash pit. A dry pit seems preferable, however, as dry ashes are far easier to handle by mechanical means. A screw conveyor is entirely satisfactory; it may either discharge ashes to an elevator and bin or the producer ash pit may be considered a one day storage bin and the ashes loaded out once a day directly to a truck.

The ash pit is equipped with suitable doors of the sealed type but they are for observation only when "ashing"; that is, when the grates are mechanically agitated. Ashing is continued until a glow appears so this producer need not necessarily be tested by rod insertion for ash bed thickness.

Ashing is accomplished by means of agitating the grates through an arm the stroke of which is induced by an eccentric. The eccentric stroke is adjustable to allow for variable nature of the ash which in some instances may be rather fine while in others quite coarse, requiring more of a dumping than sifting action.



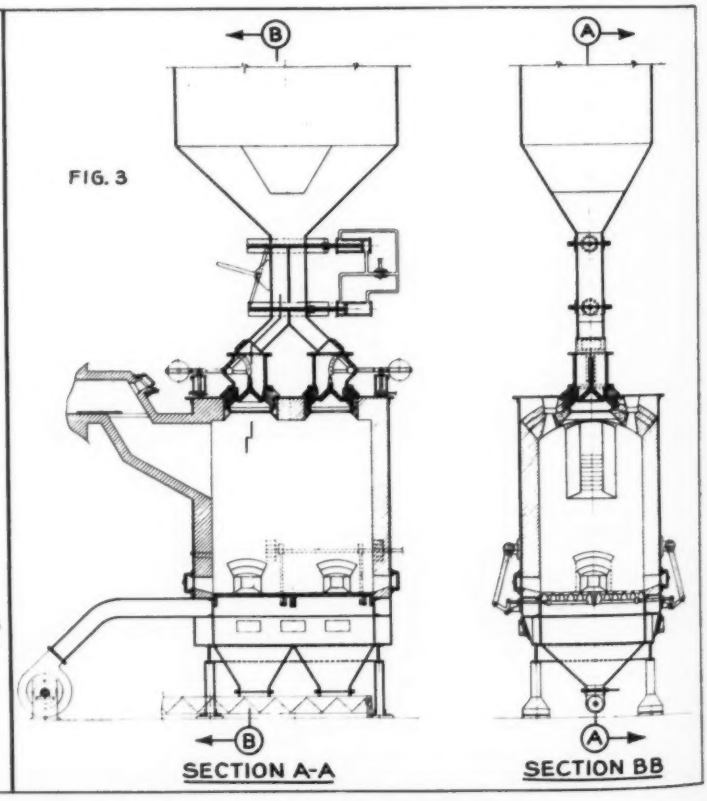


Fig. 2: Integral type with each kiln having its own producer. Fig. 3: Cross section of integral, deep-fuel bed gas producer

Clinker doors in sufficient number to readily clear the entire area are built into the side and end walls leading to a point immediately above the grates. The clinker doors for normal operation are merely a precaution which seldom would need to be resorted to. However, when the desire is for especially high grade gas, or for very high capacity, or if operation is to be with oxygen, then clinkering is more likely to occur and the convenient clinkering arrangement would allow operations which otherwise would not be possible.

The producer, depending on the size, has either one, two or three feeders. The smallest has a round shell and is square in grate area, the larger have oval shells and oblong grate systems with grates which are multiples of the smaller unit.

The feeders have counterweighted bells, which operate within a specially designed coal distributing neck. The stroke of the bell can by simple means be varied and thus coal thrown more to the middle or to the outer periphery of the respective circle charged by the particular feeder. The bell is operated by means of an air cylinder regulated by time clock mechanism synchronized with the operation of the above located twin coal shut-off sides. These operate in a manner to also measure off the coal for the feed hopper.

Twin measuring and shut-off slides are located in the chute leading from the coal bin to the feeder. The pocket between acts as a coal measure. The amount of coal fed to the producer is regulated by the frequency of the charges through adjustments of the cycle-controlling time clock. The bell and the slides may also be operated by hand. Since one of the slides is always closed it acts as a gas seal for the very short period the bell is open. The feeder has an access opening for cleaning of the bell, but this is seldom necessary since synchronization is such that fuel remains in the feeding hopper a minimum length of time to avoid caking and sticking.

There is a blower supplying air to the ash pit. For an endothermic agent, steam or carbon dioxide containing gas may be used. Hot waste gases containing CO_2 are quite suitable. In most cases a content of two to three per cent of CO_2 will effectively prevent clinkering.

Hot Blast for Producer

Producer efficiency is greatly increased if a hot blast is used. To operate with air preheated to 1000 deg. F. remains practical; the higher the initial temperature, the more energetic is the reduction reaction even though more of the endothermic agent needs to be used to avoid clinkering. Other Azbe patents cover means of obtaining preheated endothermic agent and preheated air for gas producer operation.

High Capacity Producer

Capacity of the producer is a minimum of 800 lbs. of coal per day per square foot area. The producer fed by the twin charging system as illustrated would have a gasification capacity of 20 tons per day when operated continuously and mechanically. It will gasify any lesser quantities by reducing the ash pit pressure and may gasify more when conditions are favorable. Producers of 10 tons of one basic unit size as well as 30 tons normal capacity rating, built up of three units, are also available.

We do not wish to be so presumptuous as to intimate that the gas producer here presented should be considered as worthy of entire replacement of the fully automatic high-capacity types. Often a centralized gas producer plant is to be preferred even though the use of long mains becomes necessary, as for example when a very large amount of gas is required at one point, or possibly also when the only coal available shows extreme caking characteristics. Neither do we claim that this system has no faults. The selection of whether it should be one or the other depends on local conditions, on amount of gas required, and on whether integral operation is desired and many other features.

An almost ideal application is presented by Fig. 2, a large high capacity lime kiln of 40 to 75 ton daily output, integrally equipped with an Azbe producer. In such a case there is full and ready control over the amount of gas, little trouble with soot, and a minimum of sensible heat loss from the gas. Operation is simple enough so men can readily be trained for this operation.

While the installation shown is ideal in the manner that the gas consuming unit has its own gas producing unit, if respective capacities demand, two or even three smaller units can be connected to one producer with the loss of regulating advantages. The smaller producer may be adopted to retain the integral advantages.

The integral producer system is conducive to production of low sulphur content lime which is more suitable for critical metallurgical purposes.

The greatest damage to lime in the kiln is not done by SO_2 but by H_2S. Hydrogen sulphide combines with lime very readily. It enters the lime when calcination is complete but combustion is not; that is, in the lower sections of the kiln hot zone.

It can be avoided to a certain extent by drawing either with core or close to the core, that is, as soon as possible. However, some of the lime portion is always calcined before the rest. The smaller pieces therefore will always have the highest sulphur content.

Kiln time for lime should be short if low sulphur lime is demanded. The most logical way to reduce sulphur in lime is to absorb H_2S with lime before gas enters the kiln. To pass hot sooty gas through lime has its practical difficulties; the only possible procedure is to feed lime with the coal, which method could also be used for absorption of arsenic.

It may seem that this would bring on clinkering difficulties, but it also may help the problem. Ash is supposed to clinker, but not to large clinkers. Very fine ash is troublesome, large clinkers are also, what is desired is a pebbled condition. A viscous melt is undesirable, lime reduces viscosity but also sharpens solidification which tends to globule formation.

The amount of steam or CO_2 can be increased to lower the temperature of the oxidizing zone of the producer. However, this lowers the temperature of the reduction zone as well and so lowers both the quality of the gas as well as the producer capacity. This is particularly so in the case of normal type mechanical producers of limited active bed thickness.

Government Market Booklet

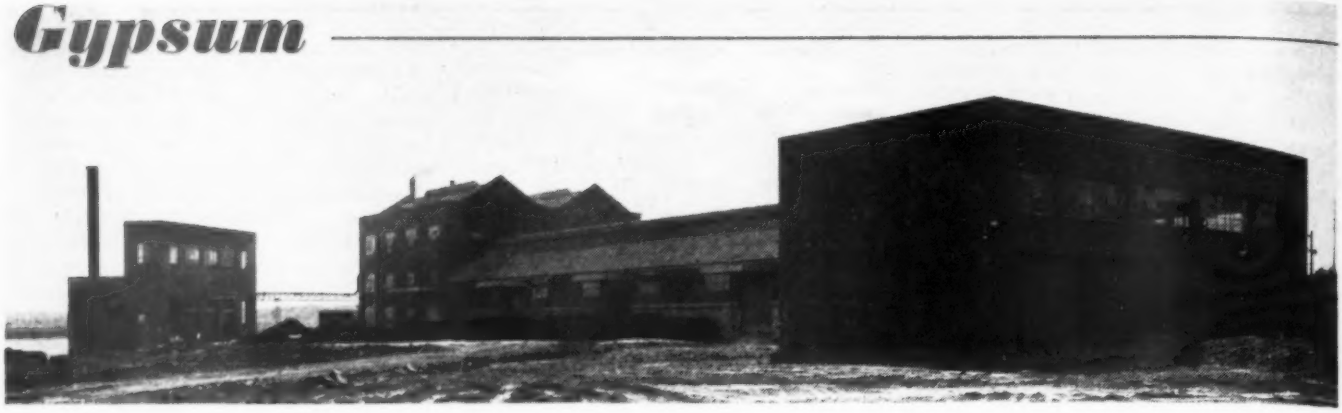
CONSOLIDATION of a series of detailed studies made by the business newspapers on federal, state and municipal markets of the nation has been made in a new 32-page booklet issued by the *N. Y. Journal of Commerce* entitled "How to Sell to the Government." Prepared as a guide to manufacturers, jobbers and dealers, the booklet explains the nature of the various government markets, tells how to get on mailing lists for materials and products wanted, and gives instructions on bidding and contract procedures. It may be obtained from the Journal of Commerce, 63 Park Row, New York 15, N. Y., at a cost of fifty cents.

Talc Company Operates Three Mills

W. H. LOOMIS TALC CORPORATION now is operating three mills and three mines in the vicinity of Gouverneur, N. Y. No. 1 plant produces 60 tons of minus 325-mesh talc per 24 hrs.; No. 2 plant produces 145 tons per day; and No. 3 plant, still being equipped, produces 45 tons of finished material per day. A. P. Loomis is president of the company, R. F. Atkinson is vice-president and general manager, David G. Ryder is mine superintendent and C. E. Tibbits is mill superintendent.

WAA Offers Fluorspar Mill

WAR ASSETS ADMINISTRATION is offering the government-owned portion of the fluorspar mill at Northgate, Colo., for sale or lease. This mill, 70 miles south of Laramie, Wyo., was operated by the Western Fluorspar Corp. Land, buildings, production machinery and equipment are offered for sale or lease as a unit. Sealed bids from non-priority prospective purchasers will be received at the Denver WAA office.



General view of plaster mill and wallboard plant near Sydney, Australia

AUSTRALIA'S New Gypsum Wallboard Plant

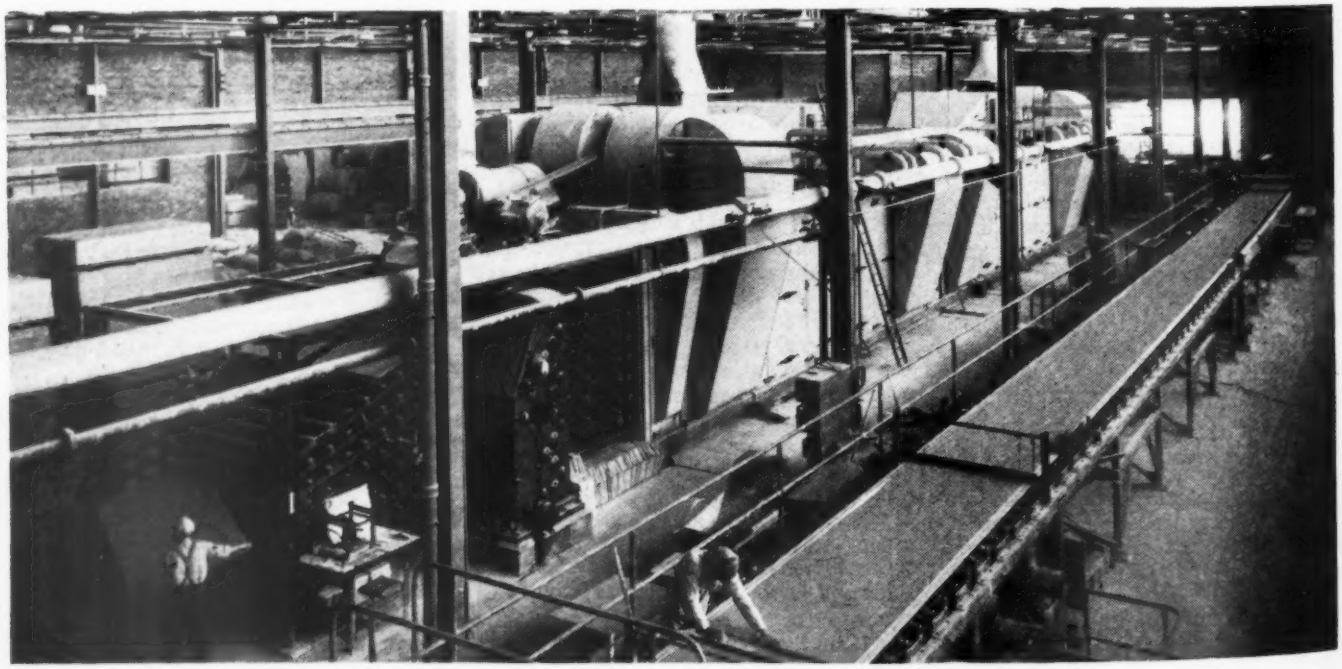
Concord Plaster Mills, a division of Colonial Sugar Refining Co., Ltd., erects wallboard plant at Concord West, Sydney, Australia

By K. O. BROWN*

AN INDUSTRY new to Australia was launched recently by Concord Plaster Mills, a Division of the Colonial Sugar Refining Co., Ltd., when a gypsum wallboard plant was erected at Concord West, Sydney. The new factory, which has a total floor area of 90,000 sq. ft., will produce approximately 20 million square feet of wallboard per annum, and, in addition, will supply plaster of various grades to the fibrous plaster, building, and other trades.

Gypsum is obtained from the company's leases in western New South Wales where very extensive deposits exist. It occurs mainly as gypsite, although a certain amount of crystal gypsum is also obtained. The deposits are generally from 4 to 6 ft. deep with 1 to 3 ft. overburden which is removed by bulldozer. The gypsum itself is also excavated by bulldozers, which then load the material up ramps on to 15-ton transport trucks. These trucks (or lorries as they are called "down-under") transport the material approximately 17 miles to the railway siding where, if possible, it is dumped directly off loading platforms into railway cars. If cars are not immediately available, the gypsum rock is dumped on to a stockpile and

*Building Materials Division of The Colonial Sugar Refining Co., Ltd.



Looking down wallboard forming conveyor to the right with dryer to the left

reclaimed later by a portable Barber-Greene bucket elevator and a truck.

On arrival at the factory in Sydney after a rail trip of 485 miles, the railway cars are unloaded by an overhead grab. This delivers the material into a hopper feeding an elevator and over-head belt conveyor which runs the length of the gypsum storage building.

Unusual Raw Storage Facilities

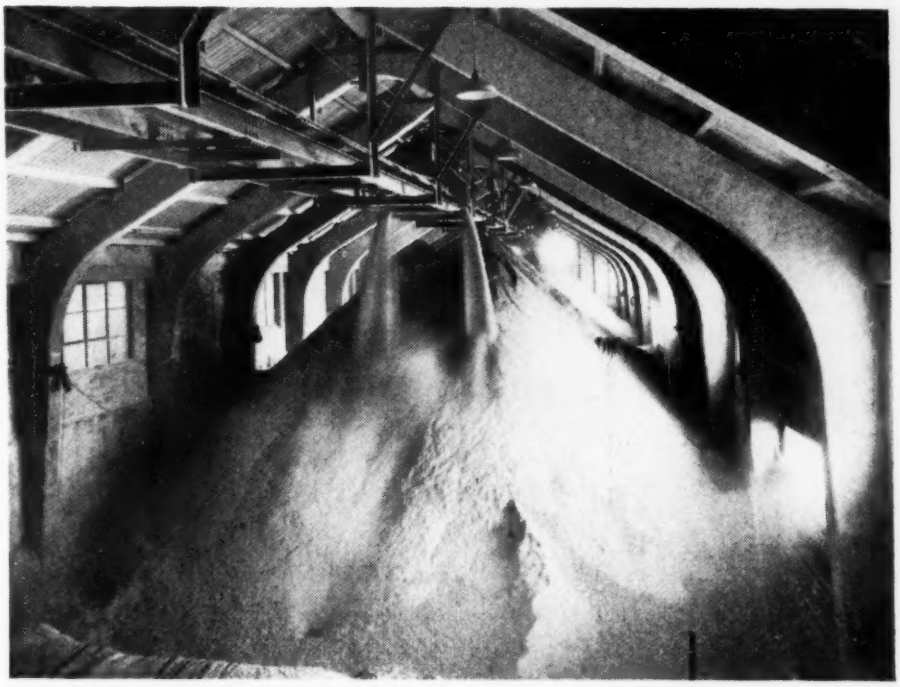
Holding approximately 8000 tons of gypsum, the gypsum storage building is approximately 300 ft. long by 42 ft. span. Side walls, 20 ft. high, are built to act as a retaining wall for the gypsum, while roof truss members have been eliminated by the use of concrete arch construction for the roof bents. The building is, in effect, one large bin. Running lengthwise in the center of the building and below the floor in a tunnel is a belt conveyor to feed the gypsum from storage into the plant. This conveyor is fed by means of holes in the floor of the storage building which are spaced at regular intervals. The recovery of gypsum is by gravity through the floor openings on to the belt conveyor. If the gypsum does not run well, as, for example, when it is damp, a drag line scraper assists by bringing the material to the openings in the floor.

Material on the belt conveyor is discharged to a bucket elevator which takes the gypsum to the grinding plant. Screw conveyors then transport the ground gypsum to bins feeding calcining kettles. In the kettles 75 per cent of the water of crystallization is boiled off at a temperature of approximately 300 deg. F. The rate of boiling and the final temperature are carefully controlled by instruments to insure a uniform product.

After calcining, the plaster is dropped into hot pits and is subsequently reground and carefully graded and then conveyed into packing bins where it is bagged for sale as plaster, or alternately, it goes to a large storage bin for feeding the gypsum wallboard plant. Special plasters for dental and medical purposes, as well as hardwall plasters and pottery plasters, are also prepared and packed in special containers for delivery.

Wallboard Manufacture

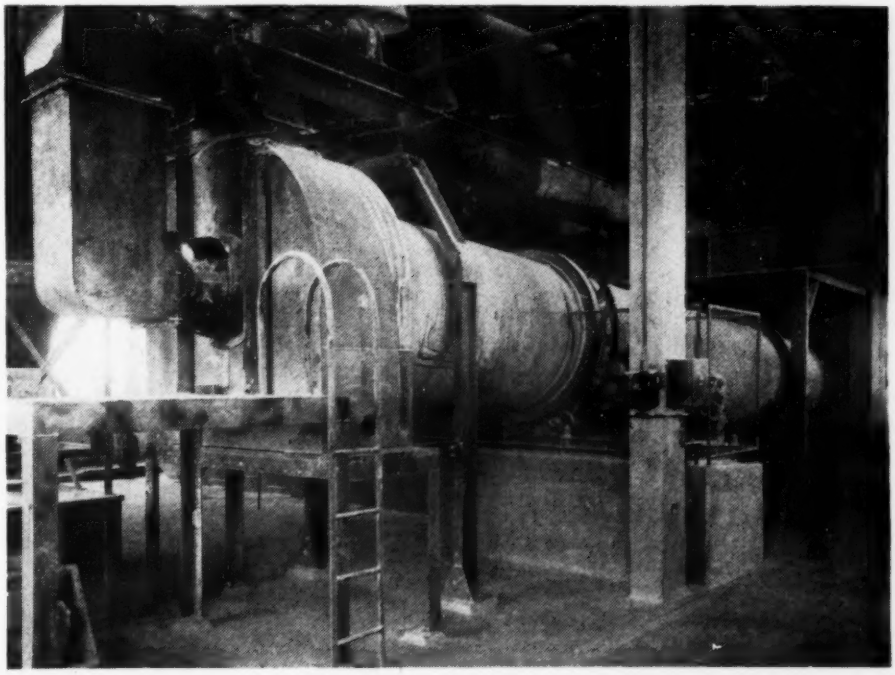
For the manufacture of gypsum wallboard, the plaster is fed from the storage bin by screw conveyor at a carefully controlled rate which is governed by a variable speed drive on the conveyor. Accelerator or retarder is added to the plaster at this stage and the whole given a thorough dry mix in order to give the mixture the setting time required for the gypsum wallboard process. Also added are chemicals to aerate the plaster and thus give a lighter board without appreciable decrease in strength.



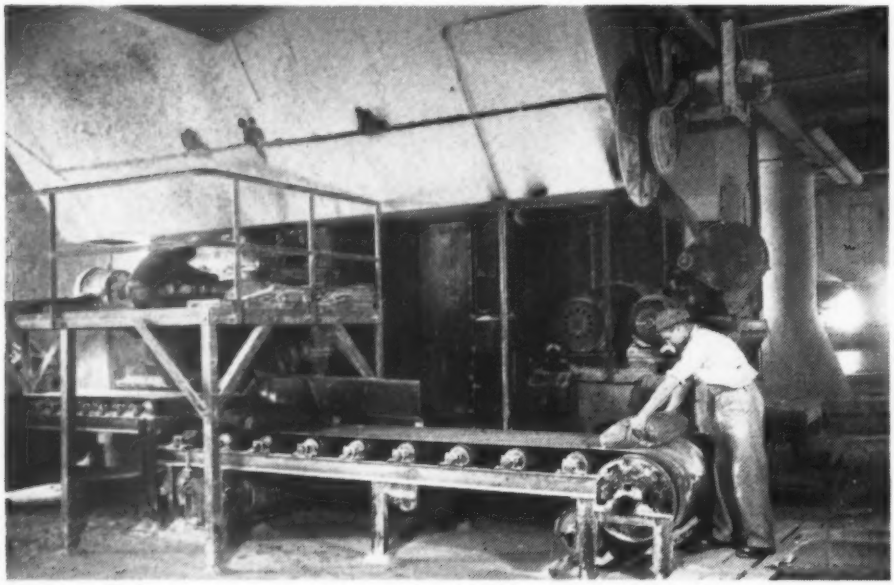
Gypsum storage building with overhead belt conveyor to distribute material. Note unusual reinforced concrete construction of the building

After thorough dry mixing, the material is dropped into special mixers where sufficient water is added to give a mixed plaster of thick cream-like consistency. This slurry is then fed on to a continuously moving sheet of special multi-ply chip board which forms one surface of the board. A second continuous sheet of paper comes down on to the top of the plaster slurry and this paper forms the other surface of the board. The two sheets of paper with plaster core are then drawn forward between two rolls which are set to give the correct board thickness. At the same time the edges of the bottom paper are turned up and wrapped over and then glued to the top paper to give sealed edges to the board. As the combined board emerges continuously from the forming rolls, it is carried forward on a long supporting belt known as a setting belt. The length of this belt is sufficient to give the plaster core time to set.

At this stage it is worth mentioning that the special chip board used in making the gypsum wallboard is manufactured in Australia. It has a pleas-



Rotary dryer for handling wet gypsum



Packing plaster in bags. Note short conveyor and pallet for handling bags by truck

Wallboard stacked by electric fork lift truck

ing, glazed, ivory top surface and comes in rolls approximately 48 in. in diameter.

Reverting to the manufacturing process. At the end of the setting belt is a knife which automatically and continuously cuts off separate boards of given length from the moving sheet of board. Immediately a length is cut off, that board is accelerated to get it away from the remainder of the moving sheet. It is passed on to a transfer table which transports it at right angles ready for feeding into a multi-deck steam-heated roller dryer where the excess water is evaporated from the sheet. As the bottom surface as formed is looked upon as the final face of the board, during transfer to the dryer all boards are automatically turned completely over so that they will run through the dryer on the back side and thus save possible damage to the face.

The dryer is of the roller deck type divided in its length into two air circulating systems, and the boards are fed in automatically by means of a tipple. When making 4 ft. wide board, two boards are fed into the dryer side by side, and when making 3 ft. wide board, three boards are fed in side by side. The dryer is steam heated with finned heaters in the upper circulating duct and with re-heating coils throughout the length of the dryer under all decks.

At the end of the dryer, the boards pass through a cooling and unloading section and are then stacked on pallets and handled in the warehouse by Australian-made battery-operated high lift fork stacking trucks.

In the warehouse all boards are carefully inspected and rejected if not up to standard. The finished boards are placed face to face and each pair of boards is clipped at the ends by gummed tape. Boards are thus shipped in pairs, each pair being held rigidly together by the gummed tape at the ends.

Delivery is partly by road and partly by rail. Trucks are loaded by means of the fork lift trucks, pallets holding 2-ton weight of board being placed on the trucks for loading railway cars, a siding has been constructed right

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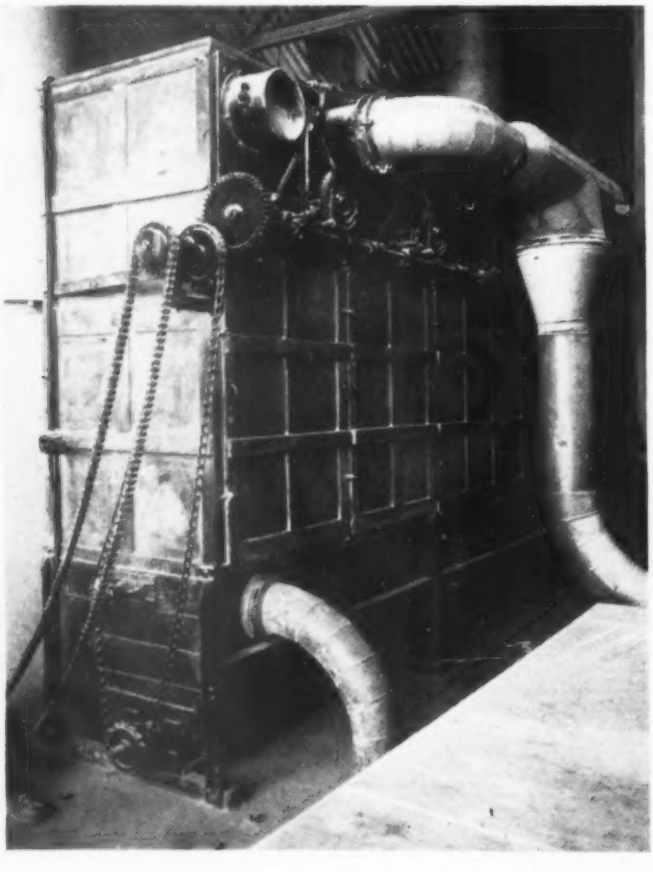
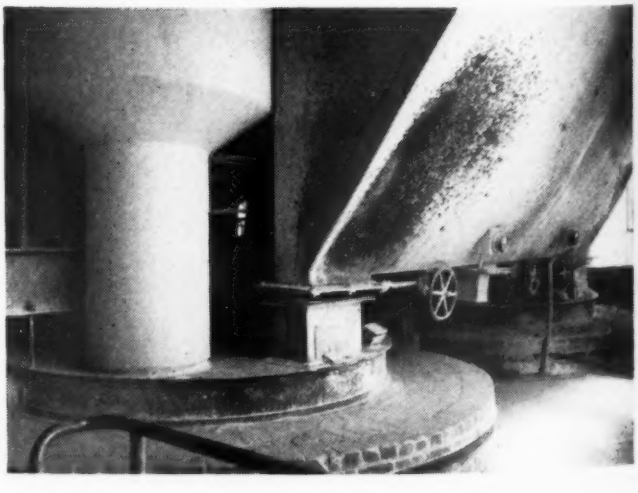


Left: Typical dust collector installation

Below: Top of calcining kettles



Outline 1948 Agstone Program at Ohio Meeting

UNDER AUSPICES of Ohio State University, the annual Ohio Lime Conference was held December 19 at the State Office building, Columbus, Ohio. With about 65 in attendance, chiefly quarry operators and spreader-truck fleet owners, the meeting followed a well planned program covering the use of agricultural limestone from the consumer's or farmer's viewpoint.

ROBERT MILES, Ohio Production and Marketing Administration office, outlined the 1948 A.A.A. program as it would affect agricultural limestone producers, spreaders and users. Over 85 per cent of the 2 million tons spread on Ohio farms in 1946 was applied with the cooperation of the A.A.A. as an approved practice, but 5 million tons of agricultural limestone need to be applied to Ohio farms each year for maximum production of sound, healthful food, according to the local P.M.A. office. Mr. Miles said that in 1948 the state A.A.A. will have only about 40 per cent as much money to distribute for all approved farm practices as in 1946 and 1947. This will mean a lowering of credit rates of 15 to 20 cents per ton under the 1947 figure.

Mr. Miles pointed out that in the past as high as 40 to 50 per cent of total A.A.A. allotments had gone to farms spreading agricultural limestone as one out of a possible 22 approved practices. The foregoing figures only apply to the State of Ohio, but in general, the remaining 47 states will follow the same pattern. Mesh specifications will be the same in 1948 as in 1947.

To open the program, plans for revamping agricultural research and education at the Agricultural College of Ohio State University were outlined by J. Wood who pinch-hit for Dean Rummell. Following Mr. Wood, agricultural agents from two Ohio counties gave their impressions of the farmer's acceptance of agricultural limestone; and what might be done to increase state consumption.

G. A. HUMMON, Norwalk county agent, said that in his opinion the most important single thing that could be done to help break down farmer resistance was closer grading or finer grinding of agricultural limestone. He felt that more stone should be offered that would grade 100 per cent passing 8- or 10-mesh. Mr. Hummon continued by saying that there was a marked tendency to switch to bagged limestone because the farmer found this form was more consistently graded. W. A. BARNHARDT, Zanesville county agent, introduced his remarks with the statement that present pastures are less than one-quarter as efficient because of the constant drain of minerals from them over the years. The main step to be taken in rectifying this deficiency, he continued, is the liberal use of agricultural limestone.

Mr. Barnhardt emphasized that addition of agricultural limestone to farm land was just as important as proper drainage; and that all agstone producers had an unpaid salesman in the form of every county agent in the state. It was pointed out in this section of the meeting that the increase in the use of agricultural limestone by farmers was chiefly due to the A.A.A. program and the chance it gave farmers to test for themselves benefits to be derived from this phase of proper soil care. In 1931, 168,073 tons of agricultural limestone were used on Ohio farms; in 1940, the fifth year of A.A.A. participation, the figure had jumped to 813,875 tons; and in 1946, the figure was 2,154,236 tons, for an increase of over 12 times in 15 years.

Following lunch, a panel discussion was held, with questions from the floor, on the subject of possible improvements in the manner of hauling and spreading agricultural limestone. An important point brought out was that in hauling finely ground or pulverized agricultural limestone from quarry to spreading point, some steps must be taken to keep it from blowing off the truck. It was pointed out that a dry load of pulverized material may lose as much as 90 lb. per mile of travel on a windy day. In addition to loss to the purchaser, agencies maintaining roads and streets objected to such a layer of dust. Two means are at hand for stopping this loss: either covering the load with a tarpaulin of sufficient weight so that there will be no whipping, or thoroughly wetting the top of the load.

In this same discussion it was brought out that a single price for "limestone spread on the ground" was meeting with less resistance in some districts than a price broken down to its component parts showing that hauling and spreading were by far the greatest part of total price. Principal part of this discussion had to do with types of spreaders and trucks. It was the general consensus that 4- or 6-wheel drive trucks were the answer; as it was brought out by those who were using army equipment that such drives made hill spreading much easier. One producer had obtained good results with army half-tracks in hilly New York state. The assembly was cautioned, however, against buying orphaned army equipment.

The final discussion of the after-

(Continued on page 126)

Above: Panel discussion group. Left to right: Walter H. Kline, Stone Products Co., Piqua; Edward Sakell, Carbon Limestone Co., Youngstown; Vernon Angevine, Patasco and G. H. Lorenz, Fresno, both dealers and spreaders; S. G. Huber, Ohio State University; and Clarence Jackman, Wauseon, Ohio, dealer and spreader. Below: Geo. Mintz, manager; L. H. Rathbun, sales supervisor; and Larry Dye, field representative, Michigan Limestone & Chemical Co.

Agricultural Limestone Producers Meet with Soil Conservation Officials and Legislators

National Agricultural Limestone Association convention in Washington, D. C., hears about Soil Conservation Program, car supply, and freight rates

AT ITS THIRD annual meeting in Washington, D. C., January 14 and 15, the National Agricultural Limestone Association voted an increased scale of dues and budgeted for an enlarged program of activities in 1948. Attendance at this convention, held again at the Statler Hotel, totaled 221, exclusive of guests from the Department of Agriculture, and invited senators and congressmen serving on the federal agricultural appropriations committee.

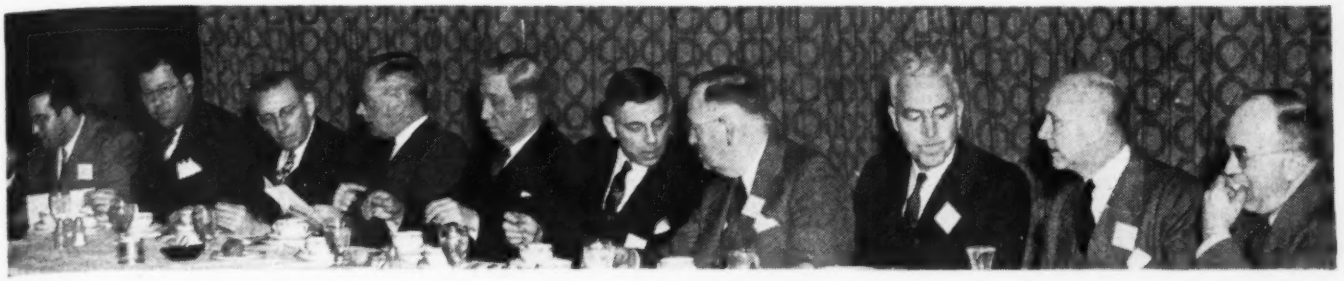
The convention was patterned along the lines of the 1947 meeting in that prominent officials of the Department of Agriculture were featured speakers and keynote banquet speeches were delivered by members of Congress particularly qualified to discuss problems concerned with agriculture. Railway car supply, freight rates and a technical presentation of the results accruing from the application of liming materials to the soil were discussed by qualified speakers and the 1948 and 1949 soil conservation appropriations and programs were considered.

New officers of the Association, elected at the meeting of the Board of Directors, are as follows: H. C. Gray, secretary-treasurer, Standard Paving Co., Tulsa, Okla., president; John M. Deely, president, Lee Lime Corp., Lee, Mass., vice-president; Harry E. Battin, Jr., vice-president, Callanan Road Improvement Co., So. Bethlehem, N. Y., treasurer; and Robert M. Koch, Washington, D. C., executive secretary.

The following Board of Directors was elected: Arthur Alvis, Butler, Mo.; A. R. Armbrust, Fayette Limestone Co., Washington C. H., Ohio; H. E. Battin, Jr., Callanan Road Improvement Co., S. Bethlehem, N. Y.; C. R. Binkley, Binkley Bros. & Ober, Dry Run, Penn.; A. M. Blumer, San Francisco, Calif.; C. A. Broecker, Newton County Stone Co., Kentland, Ind.; W. J. Clark, Munnsville Limestone Corp., Munnsville, N. Y.; J. V. Clisham, The Arundel Corp., Baltimore, Md.; W. H. Cox, Jr., Jesse Allen Lime Co., Nashville, Tenn.; J. M. Deely, Lee Lime Corp., Lee, Mass.; C. W. Duff, Avon Bend Lime Marl, Charles Town, W. Va.; J. W. Etchison, Etchison Stone Co., Casey, Ill.; N. G. Farber, Farber White Limestone Co., Franklin, N. J.; Leonard Fry, Fry Coal & Stone Co., Mercersburg, Penn.; H. C. Gray, Standard Paving Co., Tulsa, Okla.; C. P. Haun, Franklin Limestone Co., Nashville, Tenn.; Earl Heckathorn, Stuntz-Yeoman Co., Inc., Delphi, Ind.; W. E. Horne, Limestone Products Corp., Newton, N. J.; Joe Howard, Ozark, Mo.; George D. Jastram, Conklin Limestone Co., Canaan, Conn.; John C. Jeffrey, Parma, Mich.; H. W. Lamb, Grove City Limestone Co., Branchton, Penn.; Erwin Lanning, Lanning Lime Co., Oswego, Kan.; Richard Lutz, The Lutz Co., Oshkosh, Wis.; D. L. McCullough, Alabama

H. C. Gray, president, N.A.L.A.

Board of Directors, N.A.L.A. Standing, left to right: C. W. Duff, Avon Bend Lime Marl, Charles Town, W. Va.; Ralph Nolan, Nolan Stone Co., Rome, N. Y.; M. J. Wurtenberger, Frontier Stone Products, Lockport, N. Y.; Charles Rich, Swanton Lime Works, Swanton, Vt.; Earl Heckathorn, Stuntz-Yeoman, Inc., Delphi, Ind. (tall man in back); John C. Jeffrey, Parma, Mich.; Richard Mayleas, Patterson Limestone Products, New York, N. Y.; H. W. Lamb, Grove City Limestone Co., Brancton, Penn.; N. G. Farber, Farber White Limestone Co., Franklin, N. J.; W. J. Clark, Munnsville Limestone Corp., Munnsville, N. Y.; W. E. Horne, Limestone Products Corp., Newton, N. J.; D. U. Smith, D. U. Smith & Bro., Ashley Falls, Mass.; A. R. Armbrust, Fayette Limestone Co., Washington C. H., Ohio; Seated, left to right: Joe Howard, Ozark, Mo.; J. B. Mount, Maymead Lime Co., Shouns, Tenn.; J. V. Clisham, The Arundel Corp., Baltimore, Md.; C. A. Munz, Eastern Rock Products, Inc., Utica, N. Y.; H. C. Gray, Standard Paving Co., Tulsa, Okla.; E. M. Prettyman, Annville Stone Co., Conshohocken, Penn.; and R. M. Seifried, National Lime & Stone Co., Findlay, Ohio



At the speakers' table, from left to right: Robert M. Koch, secretary; Ralph Nolan, Nolan Stone Co.; Mr. Callahan, Association of American Railroads; H. C. Gray, Standard Paving Co.; Mr. Nash, Association of American Railroads; C. A. Munz, Eastern Rock Products, Inc.; D. U. Smith, D. U. Smith & Bro.; Thomas Ayers, Conservation Branch, Production and Marketing Administration, U.S.D.A.; E. M. Prettyman, Annville Stone Co.; A. W. Manchester, U.S.D.A.

Aggregate Co., Birmingham, Ala.; Richard Mayleas, Patterson Limestone Products Co., New York, N. Y.; J. B. Mount, Maymead Lime Co., Shouns, Tenn.; C. A. Munz, Eastern Rock Products, Inc., Utica, N. Y.; Norbert Neuheisel, Neuheisel Lime Works, Eau Claire, Wis.; Ralph Nolan, Nolan Stone Co., Rome, N. Y.; Joe O'Brien, O'Brien Rock Crusher, St. Paul, Kan.; Perry Pederson, Pederson Bros., Harmony, Minn.; E. M. Prettyman, Annville Stone Co., Conshohocken, Penn.; Knott Rankin, Rockland - Rockport Lime Co., Inc., Rockland, Me.; Charles Rich, Swanton Lime Works, Inc., Swanton, Vt.; Fred Roberts, Evans-Roberts, Inc., Norristown, Penn.; B. T. Scharbach, Sand and Stone, Inc., Standish, Mich.; R. M. Seifried, National Lime & Stone Co., Findlay, Ohio; Vincent Shea, Allied Minerals, Inc., W. Chelmsford, Mass.; Dermot Shemwell, Armena Lime Mine & Farms, Inc., Albany, Ga.; D. U. Smith, D. U. Smith & Bro., Ashley Falls, Mass.; E. T. Spidle, Montgomery Limestone Co., Montgomery, Ala.; T. H. Stafford, Vermarco Lime Co., Proctor, Vt.; Paul Thesen, Black White Limestone Co., Quincy, Ill.; M. J. Wurtenberger, Frontier Stone Products, Inc., Lockport, N. Y.

The Executive Committee is comprised of President H. C. Gray and the following Directors: A. R. Armbrust, Washington C. H., Ohio; N. G. Farber, Franklin, N. J.; Earl Heckathorn, Delphi, Ind.; E. M. Prettyman, Conshohocken, Penn.; B. T. Scharbach, Standish, Mich.; R. M. Seifried, Findlay, Ohio; Vincent Shea, W. Chelmsford, Mass.

President Gray named the following Directors to the Legislative Committee: J. V. Clisham, Baltimore, Md.; J. M. Deely, Lee, Mass. (chairman); C. P. Haun, Nashville, Tenn.; Earl Heckathorn, Delphi, Ind.; Joe Howard, Ozark, Mo.; B. T. Scharbach, Standish, Mich.; D. U. Smith, Ashley Falls, Mass.

Regional Vice-Presidents are as follows: Northeast Region—C. A. Munz, Utica, N. Y.; North Central Region—R. M. Seifried, Findlay, Ohio; East Central Region—J. B. Mount, Shouns, Tenn.; Southern Region—D. L. McCullough, Birmingham, Ala.; Western Region—A. M. Blumer, San Francisco, Calif.

The Association has practically doubled in size since the midsummer board meeting and new membership is just short of 300. Largest representation is in Ohio, Pennsylvania, New York State and Wisconsin, with some 110 members. Production in 36 states is represented in the membership. As a result of the rapid rate of growth, membership of the Board of Directors has been increased from 25 to 45 in order to promote more effectively the affairs of the Association.

CLARENCE A. MUNZ, Eastern Rock Products, Inc., Utica, N. Y., president of the Association, presided for the opening session which was the business meeting.

Following his calling of the meeting to order and the reading of the minutes for the 1947 meeting, Secretary ROBERT M. KOCH gave his annual report covering principal activities of his office during 1947.

Mr. Koch's report covered the first year of operation since the establishment of a paid organization during which two principal activities had been emphasized. One was a concentrated drive for membership; the other, intensive activities in an effort to help keep the government conservation program going. He commented briefly on the fact that President Truman had very recently recommended to Congress that the soil conservation payments be returned to the $300 million annual figure for the fiscal year 1949, which would return the program to the level from which it had been cut to $150 million for 1948.

One of the activities nearing completion at the time of this meeting was a mail survey of farmer opinion in each of 35 states where a member of Congress had, in the last session, voted against continuance of a substantial government conservation program. Results of the survey are to be used in promotional efforts among Congressmen.

Returns from this card questionnaire were high and the results indicated that a range of 92 to 100 per cent of farmers disagreed with their Congressmen who had opposed the desired program.

Mr. Koch intimated that there might be a tremendous program of application of liming materials the last half of 1948, depending upon Congress' action, probably in late Spring or early Summer, on the President's recommendation for a $300 million soil conservation program.

He concluded with a summary of his travel activities during 1947. He had travelled into all states where there had been contract bidding and prepared abstracts of those contracts.

Standing, left to right: C. W. Duff, Avon Bend Lime Marl; A. R. Armbrust, Fayette Limestone Co.; Ralph Nolan, Nolan Stone Co.; and Charles Rich, Swanton Lime Works; Seated, left to right: N. G. Farber, Farber White Limestone Co.; and John C. Jeffrey

John M. Deeley, Jr., new vice-president, N.A.L.A.

Following the reading of the treasurer's report by Donald U. Smith, in which he detailed the expenditure of some $23,700 in 1947 and summed up the Association's financial status, reports of standing committees were heard.

The finance committee's recommended new scale of dues encompassed substantive increases for all size groups of producers, for truckers and associate members, and was later approved. Until now, activities had been financed, mainly, by voluntary contributions.

The committee that had been appointed by the Board of Directors in 1947 to consider whether or not an effort be made to secure percentage depletion for the industry reported that, in its opinion, there was a legitimate case for the industry and that the Association undertake efforts in an attempt to secure such concession.

It was the opinion of the committee that there might be a chance to secure an amendment to the bill passed by Congress in 1947, that granted percentage depletion to certain other industries. Among industries which are permitted percentage depletion is the phosphate industry (15 per cent).

The committee on by-laws in proposing increasing membership of the Board of Directors from 25 to 45 members, recommended that after 1948, one-third of the Board be elected for one year, a second third for two years and the balance for three years, so that one-third of the total board will be up for election annually thereafter.

Long Range Agricultural Program

H. C. GRAY presided over the greeting luncheon at which DAVE DAVIDSON, assistant administrator for production, Production and Marketing Administration, U.S.D.A., was the featured speaker.

Mr. Davidson's talk was about the Department of Agriculture's recommendations to Congress for long range agricultural programs with special emphasis on the Department's recommendations for conservation programs.

In his opening remarks, Mr. Davidson complimented the Association for its activities in connection with agricultural legislation in Congress, in the fight for adequate appropriations.

In commenting on the testimony of the U.S.D.A. presented before the joint agriculture committee of Congress, he read briefly from a voluminous report that was personally presented by Secretary Anderson. Briefly, it pointed out that hope for sustained sound agriculture depends upon conservation. Of 420 million acres of land in production, half will be subject to erosion at some time. Application of greater knowledge, marketing programs and acreage allotments are essential, it was pointed out in the report, in an appeal to Congress to adopt a goal of organized, sustained abundance as a national agricultural policy.

The report plugged for more research and education in conservation practices and for incentive payments in order to attain sound conservation. It advocated physical appraisal of every farm, to which the program would then be keyed. Emphasis would be on the soils which have been damaged the most.

Mr. Davidson commented to considerable extent on the justification for making conservation payments to farmers even though farmers had had their greatest dollar volume year in history in 1947. He presented some very sound reasons why the liming program should not be put off in the face of such apparent prosperity among farmers. There are only 2½ acres of soil available per capita and the ratio will go down, he pointed out. Soil losses are of such magnitude that one-half million acres of land become unproductive each year, which is a rate that could, if not retarded, challenge our position as a leading nation. It would be cheaper to practice conservation now, he said, in pointing out that we are not yet holding our own. He believes the public is becoming conservation conscious.

Harry E. Battin, Jr., treasurer, N.A.L.A.

Payments by the government for conservation practices are needed, he said, because something specific (money) is needed to convince a farmer to adopt such practices. Further, many farmers cannot afford to do good farming. Tenant farmers are only interested in making all they can during a short period and do not have much incentive to lime soil they do not own.

In justifying expenditures, Mr. Davidson pointed out that payments are not being continued for practices that have been accomplished and that policy is to limit them to key practices and those that are urgent. Liming is one of the key conservation practices. Annual requirements according to revised estimates are for 61.5 million tons and the rate of application is still far short, at 25 million tons.

Mr. Davidson strongly emphasized that conservation payments do not constitute a dole. In his opinion, the fact that farmers are interested to the extent of footing half the bill is evidence to the contrary. No politics are involved, he insisted, in commenting on the administration of the program in the field at the county and state levels. In conclusion, he said that needs figures show that expenditures in excess of a billion dollars annually for conservation are needed to accomplish a real job.

E. M. PRETTYMAN was chairman for the first afternoon session.

ALLEN W. MANCHESTER, acting director of the Agricultural Conservation Programs Branch, Production and Marketing Administration, U.S.D.A., gave a very interesting presentation of the 1948 national agricultural conservation program and trends which are developing in the administration of the program.

One trend is toward greater delegation of the decisions and the handling of the program to state committees which, he pointed out, provides greater flexibility than an entirely federally-administered program, in filling the needs within a given state. This plan also fixes responsibility at levels, which is instrumental to more thoroughness in administering the program. Timing is becoming essentially a deal between the producer and state committees.

In Mr. Manchester's opinion, the

(Continued on page 118)

you get more work out of Mack Trucks

Hard-working Mack dump trucks serve Missouri Portland Cement Co. at its St. Louis quarries. Similar Macks are also keeping shovels busy for Lehigh Portland Cement Co.; Lone Star Cement Co.; Ashgrove Lime & Portland Cement Co.; Marquette Cement Mfg. Co.; Southwest Portland Cement Co.; Signal Mt. Portland Cement Co.; Alpha Portland Cement Co.

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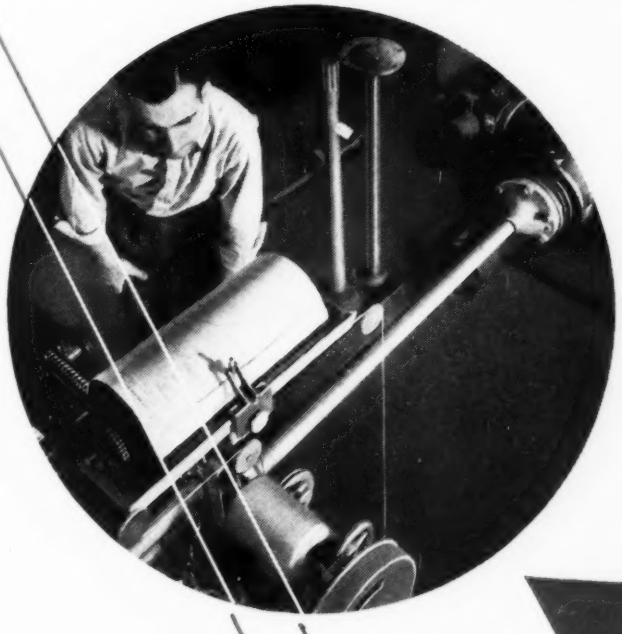

There is no guesswork about the stamina of Mack parts. This testing machine determines the strength and elasticity of Mack axle shafts by imposing measured torque up to point of fracture. Sample shafts are tested to destruction, thus insuring that all Mack shafts fully measure up to Mack's exacting standards.

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SINCE 1900, AMERICA'S HARDEST-WORKING TRUCK

Left to right: W. M. Barbee, Gibsonburg Lime Co.; John C. Jeffrey; B. T. Scharbach, Sand and Stone, Inc.; and H. C. Gray, Standard Paving Co.

practice of assisting farmers on the basis of prior approval, whereby a program is worked out for each farmer according to his specific needs, is the biggest forward step yet made in carrying out the program.

These individual deals, as he termed them, may slow the issuance of orders somewhat but they are instrumental to more effective use of the money, and close working with farmers on an individual basis provides the opportunity to put across to the farmer the necessity that he also practice conservation practices other than liming.

The share of costs for conservation practices borne by the government continues downward year by year and, according to Mr. Manchester, the records show that the number of farmers under the program is growing less. Evidently, the smaller, poorer farmers are the ones to drop out when costs to them increase. The prediction was made that 57 per cent of the cost of liming materials (the material itself exclusive of transportation and spreading) would be borne by the government in 1948, which compares with 67 per cent in 1947, or a reduction of 16 per cent.

In his comments on the reduced 1948 budget, reduced from $300 million in 1947 to $150 million, Mr. Manchester said that about $102 million would be available for allocation to the states as compared to $211 million in 1947, after accounting for all the expenses in the handling of the program. His guess is that 60 per cent as much liming materials would be purchased under the government program in 1948 as in 1947 because of the reduction in funds available. In this estimate he took into the account the fact that the government would pay 16 per cent less of the cost of a ton of material and also that in some states the purchase of liming materials would not be reduced as much as would other conservation practices. Otherwise his estimate would have been more nearly a 50 per cent reduction in tonnage to be purchased under the program. He expressed the hope that more farmers would purchase liming materials outside the program.

Funds will, of course, be allocated according to states on the basis of needs and therefore a flat prediction of relative tonnage nationally, comparing 1948 to 1947, can only be an average.

Mr. Manchester defined conservation as a practice for keeping the soil in such condition that it can meet the maximum demands to be imposed at any time. It is a "system" of farming that must be practiced continually, and liming is but a part of it.

Following completion of his talk, a very important question was asked of Mr. Manchester, as to whether producers should proceed on the basis of 60 per cent of 1947 volume in making deliveries or continue accelerated rates of delivery. Mr. Manchester replied that it would be preferable to the government that liming materials be delivered as quickly as farmers want it and, he reminded, the law provides that deliveries can be started on the 1949 program late next Summer. And, of course, there is a possibility of having the 1948 program restored to a higher figure, by amendment, which could greatly accelerate demands on the industry later this year.

Results from Liming

DR. ROBERT E. YODER, principal agronomist, Ohio Agricultural Experiment Station, Wooster, Ohio, in his talk, "Research Results in Use of Agricultural Liming Material," showed a number of slides to illustrate farming practices, dollar returns from liming with various types and fineness of material for principal crops, needs, etc.

Ohio is now applying liming materials at the rate of one and one-half million tons annually, a figure which is required for soil maintenance only.

In discussing farming practices generally, Dr. Yoder mentioned the serious rate of soil depletion and, he said, that five states had to produce most of the heavy crop demands imposed by the war, because they were the only states that had the soil able to do the job. The amount of sod-crops must be increased in relation to row crops, he said, in pointing to ratios prevailing today that constitute harmful practice insofar as conservation of our soils is concerned.

D. U. SMITH presided over the morning session, January 15, devoted to papers on the long range limestone needs, the status of freight car supply and freight rate increases.

Speaking on the subject of "Our Long Range Limestone Needs," THOMAS L. AYERS, Chief of the Division of Program Planning, Agricultural Conservation Programs Branch, Production and Marketing Administration, U.S.D.A., emphasized the over-all conservation needs of the nation, of which liming is only a part and the need for having certain other practices accomplished in order that liming be effective.

The immediate need features of liming the soil should be forgotten, he said, and all efforts be concentrated on the long pull requirements—a continuing program. Liming materials were needed whether we had a war or not, he said to emphasize his point. New estimates for annual requirements for liming materials, now based on long range considerations, have increased the figure some 20 per cent over the 52 million tons figure until recently considered the goal.

Needs figures depend upon the application of the other basic conservation practices such as application of phosphates, etc. He stressed this by mentioning how the application of liming materials, under certain conditions, not only would not yield good results but actually may be harmful.

Mr. Ayers looks upon soil conservation with government funds as an investment in soils by non-farmers, rather than as a plan to benefit farmers as such. Committeemen are trustees, according to his reasoning, who take funds supplied by non-farmers and apply them so that these same non-farmers will benefit.

In concluding, he urged producers to make a contribution to the program over-all by lending their influence to farmers to see that they do everything required for adequate soil conservation. Planning with local committees would be a step in that direction.

D. U. Smith, in commenting on this suggestion, said that the industry must get on the same footing at the state level as it now has with the agricultural officials in Washington.

Car Supply

W. E. CALLAHAN, Association of American Railroads, in clarifying the status of supply of freight cars, outlined the reasons why there had been shortages in 1947 and predicted a marked improvement in the situation just ahead.

A total of close to 50 million cars loaded in 1947 was 7½ per cent greater than in 1946 and the ton mile figures in 1947 were among the three biggest years in history. Heavy ore, coal, wheat and construction materials movements plus great demands for cars in connection with the export program were factors responsible for the car shortage. Over-all shortages

(Continued on page 120)

HOW TO DIG A DITCH — AND NOT GO IN THE HOLE

Yager and Sons, Beaverton, Michigan, call the 3-cylinder GM Series 71 Diesel that powers this shovel "just about the best power we've ever used." Inset shows Mr. Fay Yager, in charge of the shovel operation, who says, "You fellows just don't boast enough about that GM Diesel engine."

Shown here is a General Motors Diesel-powered Bay City ¾ yard shovel. It's doing the toughest part of a pipe-trench job—mile after mile of 6′ by 12′ trench—cutting through wet sand, swamp mud, pulling stumps, digging in the roughest kind of terrain.

Taking jobs like this in stride is everyday work for GM Diesel-powered equipment. The 2-cycle GM Diesel gives instant response to widely fluctuating power demands, operates on low-cost fuel, and delivers long, economical service.

No wonder so many operators rely on GM Diesel power to help them trim costs on close-figured contracts. You, too, will find it pays to specify GM Diesels for repowering old equipment or when buying new. Write today for complete details.

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GENERAL MOTORS

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GM GENERAL MOTORS DIESEL POWER

were as high as 225,000 cars in a single week and as much as 90,000 open top cars a week.

In 1947, 57,400 new freight cars went into service but 65,700 cars (many obsolete and not serviceable) went out of service. Before the war, the new car rate was 100,000 annually. Mr. Callahan hopes and believes that 120,000 to 140,000 new cars will become available during 1948. Some 55,000 gondolas and hopper cars were on order as of January 1. Exportation of railroad cars is to be stopped until domestic needs are filled.

Freight Rates

WALTER J. KELLY, traffic manager, Association of American Railroads, explained the necessity for freight rate increases. Freight rates were at the same level in 1945 as before the war, and labor wage rate increases were the main reason for recent increases in rates granted.

Reception—Banquet

Some 20 senators and congressmen were guests of the Association at a reception and banquet which was highlighted by two very excellent speeches by representatives of Congress who very obviously have the interests of farmers at heart.

The speakers were Senator GEORGE A. AIKEN of Vermont and Representative STEPHEN PACE of Georgia who spoke on "Perpetuating Our Agricultural Production" and "Our Farm Problems," respectively.

Senator Aiken as chairman of a Senate Sub-Committee on Agriculture and Congressman Pace as a member of the House Committee on Agriculture, studying long range agricultural policy, recently completed hearings throughout the country to get first hand reactions of farmers in regard to farm problems. Both talks were inspirational and left us with the impression that farmers and the agricultural limestone industry are to go forward, if their convictions are supported in Congress.

Senator Aiken told briefly of his observations in his travels and said that the conservation funds must be restored to the higher level, at this session of Congress. He had made his trip by air and had had good opportunity to observe the damaging effects of erosion over the country. Our rate of population increase and the fact that half of the world is going hungry will, in his opinion, require the United States to double its agricultural production by 1970 and, eventually, this country will itself need all the agricultural products it can possibly produce. In measuring the income of farmers, he said that no allowance is given the farmer for soil depletion and the nation should provide allowance to the farmer, who is in effect selling soil.

Congressman Pace reported that everybody he came in contact with on his trip wanted an adequate soil conservation program. The need, he said, is to provide means in this Congress to stabilize agriculture, to give protection to the producers of food. In this country, depletion of soils has been progressing far faster than in any nation in history and if continued at that rate for another century and a half the United States could become a "has been" among nations. He advocates a strong conservation program, adequate support for prices, an adequate program for crop insurance and making farming sufficiently attractive to keep would-be good farmers on the farms.

Addition to "Caribbean Gold"

WALTER ERNST, superintendent of the San Juan plant for two years from 1938, was not mentioned in connection with this plant in the article "Cement, the New Caribbean Gold," appearing in the December issue, ROCK PRODUCTS. This was an oversight, as Mr. Ernst was instrumental in starting operation of the plant, and in building an operating organization chiefly with Puerto Rican labor.

Pavement Yardage

AWARDS of concrete pavement for December and for the calendar year 1947:

	Square Yards Awarded During Dec. 1947	Square Yards Awarded During Year 1947
Roads	1,678,374	21,763,459
Streets and Alleys	850,978	14,551,207
Airports	123,809	1,582,552
Total	2,653,161	37,897,218

Left to right: C. A. Prall, Rush County Stone Co.; Rep. Noble Johnson of Indiana; D. U. Smith, D. U. Smith & Bro.; H. P. Fraubiger, Warsaw Coal & Limestone Co.; Earl Heckathorn, Stuntz-Yeoman, Inc.

Permissible Underground Multiple-Shot Blasting

A PERMISSIBLE multiple-shot blasting unit capable of firing 10 detonators connected in series has been developed by the Bureau of Mines, and found safe for use in underground coal or other mines where natural gas-air mixture is as high as 8 per cent. A 4-volt cap-light battery provides the source of energy for this unit. A copy of Report of Investigation 4136, "Vibrator-type Multiple-shot Blasting Unit," may be obtained free by writing the Bureau of Mines, 4800 Forbes Street, Pittsburgh, Penn.

Dust Collector Installed

OHIO HYDRATE & SUPPLY CO., Woodville, Ohio, is completing installation of new lime dust collection equipment at its plant, according to Fred Witmer, Sr., president. Dust recovery will be from the hydrating mills and the bagging operation. The project was started a year ago, but was held up due to material shortages.

Quarry Signs Needed

PAUL N. DOLL, manager, Missouri Limestone Producers Association, makes a worthwhile observation regarding quarry signs in the Association news letter. He points out that too few quarries maintain adequate directional signs on the closest main highway. Mr. Doll says further that not only does a sign help farmers find the source of agricultural limestone, but a well painted sign is a constant reminder to the public that the quarry is nearby and ever ready to serve.

Purchase Gravel Co.

NEW LONDON SAND & GRAVEL CO., New London, Minn., formerly owned and operated by H. L. Wadell, has been purchased by a group headed by L. W. Hallett and J. A. Woodhall. The firm will retain its same name and offices in Willmar.

New Strata of Gravel

LAYNE-WESTERN CO., Tecumseh, Neb., through drilling operations, discovered a strata of gravel north of that city believed to be from 30- to 40-ft. thick and above the 100-ft. level. Samples have been taken to the University of Nebraska for analysis.

Install Dust Collectors

PIQUA STONE PRODUCTS CO., Piqua, Ohio, in an attempt to eliminate a limestone dust nuisance, has ordered two Type-N Roto-Clone collectors, Lawrence Townsend, general manager, has announced.

Quarry Purchased

EVANS QUARRY, Hot Springs, Kan., has been purchased by H. Eyrich of Custer. The quarry is well known as a source of pink sandstone, and has supplied building stone for many local structures.

Clean Sands

reduce your costs!

USE THE WEMCO SAND PREPARATION MACHINE TO ANSWER YOUR PROBLEMS OF

1. Dewatering
2. Preliminary sand cleaning
3. Beneficiation—control of fines
4. Beneficiation—control of medium fractions
5. Sand manufacture
6. Preparation of special sands

***To do your specific job** Wemco has available machines in various sizes and different designs to handle up to 500 TPH.*

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"Best in Sand Preparation Machines"

Wemco Sand Preparation Machines are producing clean, dry *sands. Clean sands, free of excess moisture, lower your production costs because:*

a/Sands Meet Specifications . . .

no rejected lots—the inherent design gives you the required settling, separating and washing action. Steady, trouble-free production of *clean, dry* sands eliminates the danger of entire production lots being rejected.

b/Operation is Automatic . . .

Reduced attendance costs, low horsepower requirements, long life of wearing parts, and "lubricated-for-life" bearings keep operating costs to a minimum.

c/Low Maintenance Costs . . .

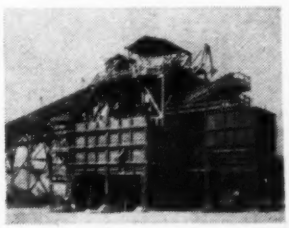
Only 1/10 of 1 cent/ton of dry sand produced.

d/Reduced Sand Shipping Costs . . .

Elimination of free excess moisture means you pay shipping costs on *sand*, not sand plus water.

These factors, combined with many other mechanical and operating advantages, give you assurance of a sand preparation method that will result in steady volume production of *clean, dry* sands at minimum cost to you.

California Rock and Gravel Company uses two No. 48 and one No. 78 Wemco Sand Preparation Machines.



Herndon Rock Products plant of Stewart and Nuss, Inc. uses a No. 60 Wemco Sand Preparation Machine.

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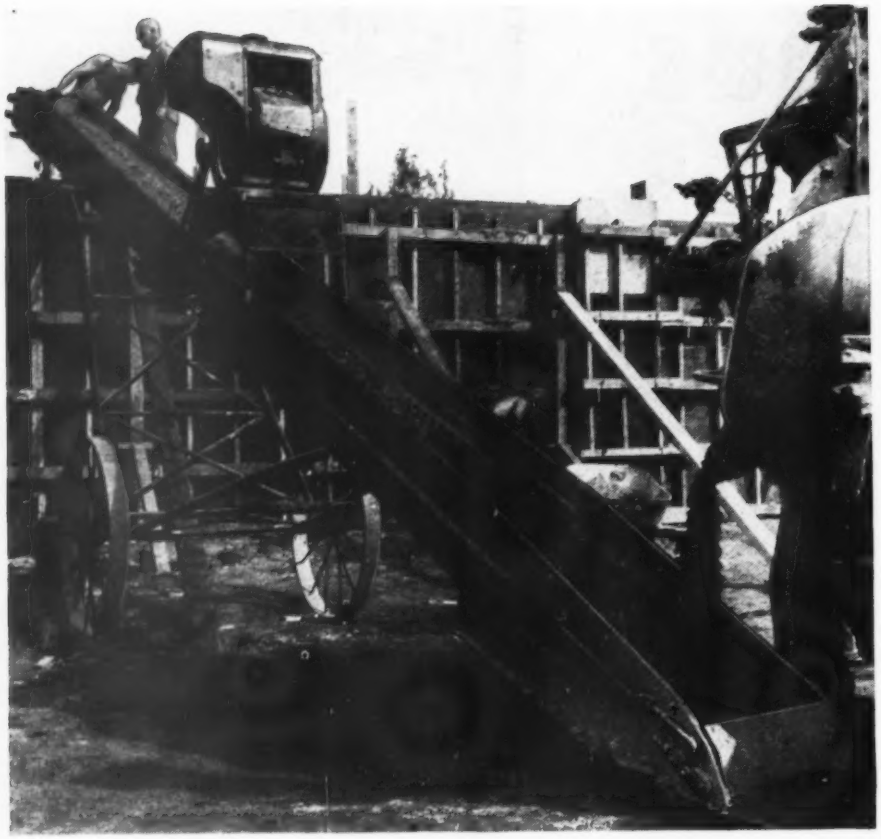

Farquhar Trough Conveyor "PAYS FOR ITSELF"

handling wet concrete from mixer to forms

ON one job alone, handling wet concrete from mixer to forms, this Farquhar Trough Conveyor — Model 343 — more than *paid for itself* in time and labor saved. No hoist operator was needed; scaffolding was eliminated on this construction project . . . the Farquhar Conveyor fed concrete to the forms at the rate of one cubic yard a minute—faster than the contractor believed was possible.

For All Handling Jobs

General-utility Farquhar Trough Conveyors handle sharp or abrasive materials, fine or powdery materials, small bags or bundles *faster, better, cheaper* than old-fashioned handling methods. Contractors, chemical plants, coal yards, warehouses—all industries turn to Farquhar for the right answers to specific handling problems. Farquhar offers a complete line of conveyors for portable, semi-permanent or permanent use, handling all kinds of loose or packaged materials. Tell us your problem—we have the know-how to help you. Write A. B. Farquhar Co., Conveyor Division, 236 Duke St., York Pa., or 628-A W. Elm St., Chicago 10, Ill.

MOVING DIRT *from basement excavation direct to dump truck with gas engine-driven Farquhar 334-T Conveyor saves time for contractor . . . hard, back-breaking work for men.*

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FARM EQUIPMENT
FOOD PROCESSING AND
SPECIAL MACHINERY

Pennsylvania Meeting

(Continued from page 91)

to the flow, variable speed and cross rods to induce the tipping of long pieces of aggregate.

In the discussion of this subject, highway engineers said that when the amount of flat and elongated particles is excessive, the void content of a mix cannot be reduced to normal even with compensating changes in gradation. The result is the need for increased sand, more water, lower strength and higher costs for concrete. In macadam construction an unstable base is the result of excessive "off-shape" particles, in their opinion.

Wash Test

J. E. GRAY, field engineer, National Crushed Stone Association, read a paper, "Method of Conducting Wash Test and Percentage of Loss which Proves Detrimental in Construction." He discussed accepted methods in detail and recommended that a mixed sample be taken from cars for tests at destination in order that tests may be representative. This is to compensate for the effects of rainstorms, resulting in clean stone on top and segregation throughout as a result of washing the fines down through a carload. Some figures were given to show that dust in appreciable amounts has slight adverse effects.

The highway department has experienced some troubles resulting from excess crusher dust in aggregates and mentioned instances where there have been losses in excess of four per cent as measured by wash test. There have been cases, they cited, where the wash test loss was only one-half per cent at a plant; yet the loss was measured as three per cent for the same aggregate at destination. The reason was that trucks had been run back and forth over the aggregates in stockpiles. Even a little crusher dust prevents proper coating of aggregate with bitumen, in their experience, excess bitumen must be used and the consequence is stripping in bituminous pavements.

Standardization of Sizes

FRED HUBBARD, National Slag Association, discussed the standardization of aggregate sizes and showed by chart the relation of Pennsylvania sizes to those of the Simplified Practice Recommendation. He complimented the highway department for requiring relatively few sizes (8) and pointed out minor changes that would bring the two specifications for aggregate sizes in question into almost complete agreement.

In a discussion of the Los Angeles Rattler test as a measure of hardness and strength of aggregates, STANTON WALKER, director of engineering, National Sand and Gravel Association, discussed, principally, factors in conducting the test that lead to variations in test results. Test results will

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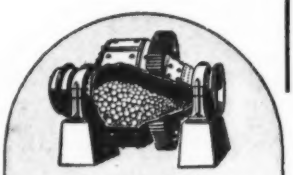

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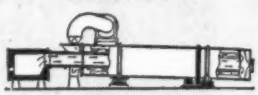
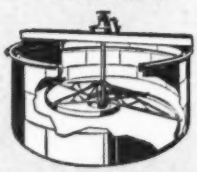
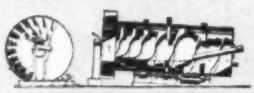


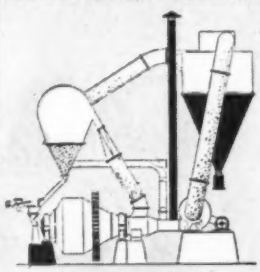
ROTARY DRYER



AUTO-RAISE THICKENER



COUNTER-CURRENT CLASSIFIER



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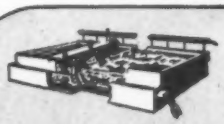
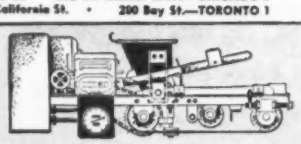


A.B.W. SAND FILTER



CONSTANT WEIGHT FEEDER

Pennsylvania Meeting

(Continued from page 122)

vary with the width of the internal shelf. As the shelf wears, results may become unreliable. Also, the position of the shelf with reference to the door will have a bearing. If the aggregate falls on the door, the test results may be too severe. Uniformity of speed is essential to reliability, he said, in suggesting that counterbalancing be provided to overcome the effect of slippage in the drive. Moisture in the aggregates contributes to unreliability of testing, he said, in emphasizing that samples must be oven dry.

Only 14 state highway departments do not specify the Los Angeles Rattler test, said Mr. Walker, in detailing the permissible losses being specified. He mentioned that actual losses ranged from 14.8 per cent up to 60 per cent for 103 sources of gravel that he had tested.

E. E. DOTTER, General Crushed Stone Co., recommended several minor changes in Pennsylvania stone sizes and the discontinuance of one size in the interests of saving production expense. The highway department will consider the proposal at a later date.

The final scheduled session considered material problems as they effect the construction industry. Both builders and the highway department paid tribute to the Pennsylvania aggregates industries for their cooperative part in the highway construction program. Contractors appreciated the fact that the aggregates producers quoted firm prices and the highway department said there were very few cases where the cement factor had to be increased because of gradation variations. A new inspectors' "bible," bulletin No. 17, will soon be available from the Highway Department, with exact instructions that, it is hoped, will lead to less variation in testing procedure and results by inspectors.

EYRE PRICE, Wyoming Sand and Stone Co., in a discussion of the preparation and production of bituminous mixes, commented on the need for uniformity of aggregates, car shortages, etc. He has employed a testing engineer at his plant, who was sent to the highway department's inspectors school for training and, according to Mr. Price, having an inspector has paid dividends.

Fred Hubbard commented briefly on the practical problems in introducing dust into bituminous mixes where plants are equipped with dust collectors. Specifications set a limit of 10 per cent minus 200-mesh particles and the trick is to be able to feed the dust to the hot elevator at a uniform rate.

There is a decided trend away from cold mixes to hot mixes in Pennsylvania. The volume rate was 66 per cent cold mix to 34 per cent hot mix in 1944; in 1947, only 18 per cent was cold mix and 82 per cent hot mix.

I. H. BOGGS, General Crushed Stone

Co., led a technical discussion of aggregate problems affecting bituminous concrete and, as a result of data he had compiled, recommended that the upper and lower limits of permissible 200-mesh fines be widened and that increased thicknesses of bituminous surfacing be applied over old highways.

Election of Officers

The Pennsylvania Stone Producers Association, Inc., held its annual meeting preceding the meeting of the aggregates and construction industries.

T. C. McPoyle, John T. Dyer Quarry Co., Norriston, Penn., was elected president; Paul I. Detweiler, New Enterprise, vice-president; Elwood Gilbert, New Castle, treasurer; and Walter D. Fehr, Reading, secretary. Elected to the board of directors were J. R. Peacock, Bethlehem, and H. M. Binkley (eastern region); W. E. Wilson, Harrisburg, and S. D. Narehood, Milton (central region); and Charles Coburn, Youngstown, Ohio, and Paul Walker, Chambersburg (western region).

Tribute was paid retiring president John Curtin, Sr., by John Rice, Jr., at the opening session of the joint meeting with the highway department officials. Mr. Curtin had served the Association as president for three consecutive terms and was credited with having organized the Agricultural Limestone Division which now has 26 members. Membership in the Pennsylvania Stone Producers Association now constitutes 90 per cent of the crushed stone tonnage in the state, a high figure for which Mr. Curtin was given much credit. John Curtin, Jr., newly-elected president of the Warner Co., and his two younger brothers, both in the sales organization of the Warner Co., were asked to take a bow with their father.

The Agricultural Limestone Division of the Pennsylvania Stone Producers Association convened January 8 at the call of the Pennsylvania State Production and Marketing Council. Producers were advised of increases in allocations for 1948, from $1,900,000 to $2,900,000 for conservation purchases which are being sent on to Washington. F. E. Wholaver, Whiterock Quarries Corp., is chairman of the Division.

Left to right: Paul Walker, Chambersburg Stone Co., and Carl Beckler, Bethlehem Steel Co.

There's no point in monkeying around with makeshift wire rope fasteners, on jobs *where safety comes first.* All over the world, big jobs and small jobs are rigged with genuine Crosby Clips. They're steel, drop-forged, hot dip galvanized. Correct design makes a positive "vise-tight" grip. Complete run of sizes . . . for ⅛ inch to 3 inch wire rope. Distributors everywhere. Made only by American Hoist and Derrick Co., St. Paul 1, Minnesota.

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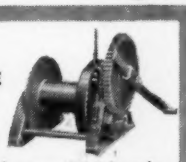

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Ohio Meeting

(Continued from page 113)

noon, concerned with increasing agricultural limestone use, was led by Clay Stackhouse, president of the Federation of Soil Conservation District Supervisors and himself a farmer. He spoke of tests conducted on his own and neighboring farms, using approved soil conservation practices, and the dollar value return to the farmer using properly installed drain tile, agricultural limestone, legumes, etc., was an actually measurable amount. Figures show that a cost of $7.75 for fertilizer and limestone return an increased yield worth $33.37 above the cost of treatment over an untreated section.

In addition to producers and spreader-truck operators contributing to the Ohio Limestone Conference, the meeting was also attended by Kenneth Hawkinson, Quality Limestone Institute and William Stone, president, Processed Limestone Association, Inc., both of Washington, D. C. Also attending were George Mintz, manager; L. H. Rathbun, sales supervisor, and Larry Dye, field representative, Michigan Limestone & Chemical Co., Buffalo, N. Y.

Australia Wallboard

(Continued from page 112)

into the factory warehouse, thus enabling loading to be carried out by either fork-lift haulage units or by an overhead 3-ton electric crane which runs the length of one bay of the warehouse.

Steam is supplied to the wallboard dryer from two fire tube boilers fitted with under-feed stokers. Coal for the boilers is delivered either by highway trucks or by rail. In either case it is dumped into a hopper below the railway siding where it is picked up by an underground Redler type conveyor and finally elevated into bunkers over the boilers.

No effort has been spared to make the whole plant dust free, as apart from the desire to have a clean plant and to give the workmen good conditions, the factory is situated close to a residential area. It was considered highly desirable, therefore, to prevent emission of smoke, dust, etc., which normally is accepted as part of a plaster mill. To prevent smoke and dust emission, the boiler stack is fitted with cyclone type fly ash collectors, while the kettle outlet stacks are connected to specially designed collectors to prevent dust escaping with the steam. Dry dust from grinders, bagging operations, conveyors, etc., is drawn to large capacity bag type (stocking) collectors which recover the plaster dust and return it to process.

Establishes Display Room

PENINSULAR PERMASTONE, INC., has announced the establishment of an office and display room at Jacksonville, Fla.

Lawrence Quarry

(Continued from page 101)

The whole quarry plan has been given a great deal of study and all steps have been taken with the object of first delivering a suitable blend of rock as far as chemical composition is concerned to make uniform and high quality cements, and secondly, getting this rock into the storage piles at as low a cost as possible.

This company also has a lime burning plant alongside the cement plant, but at present the lime quarry is being operated as a separate unit. However, under the new set-up it will be possible for one quarry crew to supply enough rock for both plants. This will also give the quarry another face, for the lime plant's rock comes from a section of the quarry some 22 ft. below the present main quarry floor. The hand size stone for the lime kilns will be scalped out in the crushing plant assembly and transported to the lime kilns by trucks. At present 29 men are employed in the cement quarry section and 11 in the lime quarry. When the development is completed, it is expected that 26 or 27 men will operate the entire quarry.

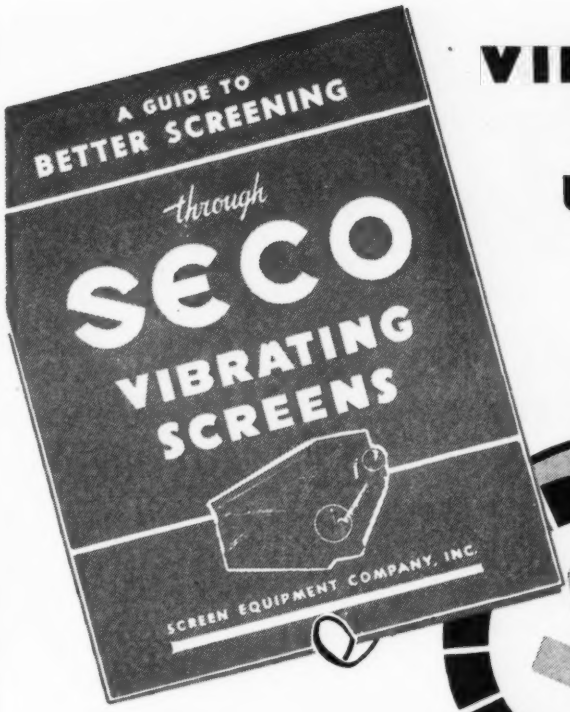
W. R. Cliffe of L.I.M.E., Hershey, Penn., was consulting engineer and planned the project. The work was undertaken and is being carried on to completion under the supervision of John Pomeroy, plant manager, for Lawrence Portland Cement Co.

Welding Award on Roll Crusher Design

HARRY J. SHELTON, JR., chief design engineer, Gruendler Crushing and Pulverizer Co., St. Louis, Mo., and Joseph K. Tanaka, industrial engineer, Designers & Builders Associated, St. Louis, Mo., recently received an award of $100 from trustees of the James F. Lincoln Arc Welding Foundation for the paper entered in the Foundation's recent Design-for-Progress program. The paper covered the design and fabrication of a special single roll crusher, a machine used to crush coal, rock and hard clays. Utilizing welded steel construction rather than cast iron resulted in a 47 per cent reduction in weight, an estimated reduction in cost of 45 per cent, and an estimated reduction in production time of 50 per cent. The finished machine weighed 12,300 lb. and cost $1876 to build.

Construction Specifications

ASPHALT INSTITUTE has issued revised and additional construction specifications in a new 304 page book, replacing a previous issue dated May 1, 1944. It is being distributed on request to engineers and officials concerned with such designs, when their requests are received on engineering or official letterhead, and addressed to the Asphalt Institute, New York 17, N. Y.



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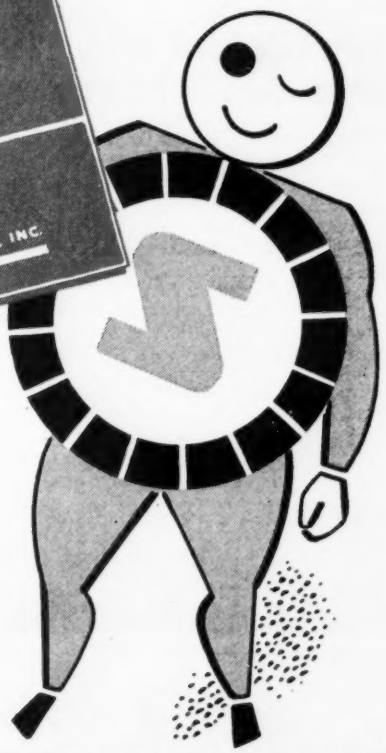

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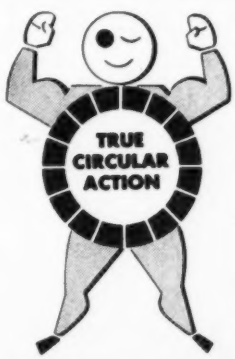

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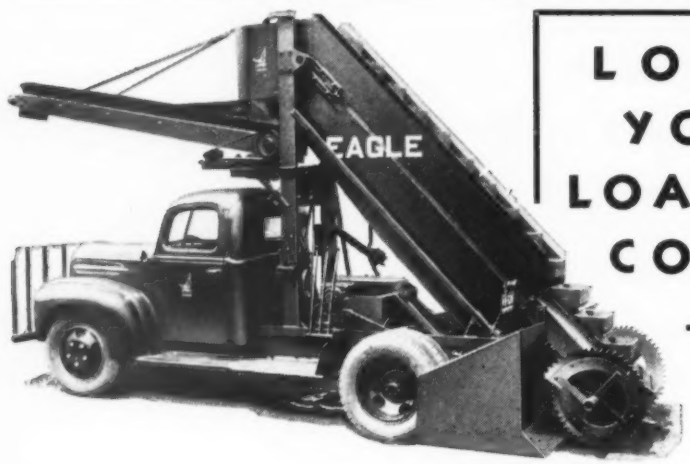

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Eight Brothers, Sister Operate Quarry

SIEVERS BROTHERS Limestone Quarry, Fieldon, Ill., is strictly a brother and sister affair with all but five of the 14 brothers and sisters in the Sievers family actively engaged in the business. Production at the quarry, using two Model HP-600 Cummins Diesel engines operating a Gruendler 3XB crusher and conveyor belts through a six V-belt drive, is 300 tons of agricultural limestone and 300 tons of road rock per day. The eight brothers and one sister operating the quarry are: Albert, Bernard, Carl, Elmer, Edmund, Henry, John, Lawrence and Mary.

Stone Deposits Mapped

A MAP SHOWING locations of construction materials in the southern half of Williams County, North Dakota, released to open files by the Department of the Interior, may be referred to either at the University of North Dakota or in Washington, D. C. The map was drawn up as an aid to engineers and contractors in locating suitable deposits of sand, gravel and riprap. The map was made in conjunction with the Department's program for Missouri river basin development.

Start Gravel Plant

WILLIAM LYNARD has begun operation of a new sand and gravel plant located on a 90-acre site between the Blue Earth and Minnesota rivers, near Mankato, Minn. No material will be taken from the rivers this Winter, but next Spring Mr. Lynard expects to begin removing gravel from this source if it is possible to do so without damaging the river banks.

Opens New Factory

SCREEN EQUIPMENT CO., INC., makers of Seco Vibrating Screens for sand, gravel, stone products and cinders, has opened a new factory and

New screen manufacturing plant

general offices at 1750 Walden avenue, Buffalo, N. Y., according to an announcement by C. Stuart Fielding, president of the company.

The new factory has approximately 25,000 sq. ft. of floor space and is being devoted entirely to the manufacture of the Seco screens. In addition to the regular line of single, double, triple, and three and one-half deck screens, the company also manufactures vibrating screens to specification.

FINANCIAL

RECENT DIVIDENDS

Arundel Corp.	.25	Dec. 29
Coronet Phosphate	4.50	Jan. 2
Gyps. Lime & Alab., Can.	.25	Mar. 1
Gyps. Lime & Alab., Can.	.25	June 1
Gyps. Lime & Alab., Can.	.25	Sept. 1
Missouri Portland Cement	.50	Dec. 19
Ohio Gravel Co.	2.50	Dec. 20
Superior Portland Cement	.50	Dec. 23
Permanente Cement Co.	.25	Jan. 30
Lehigh Portland Cement Co.	.37½	Mar. 1

PERMANENTE CEMENT CO., Oakland, Calif., has reported the following account of income for the years ended January 31, 1947:

	Years to Jan. 31 *1947	*1946
Net sales	$11,191,584	$7,512,628
Cost of sales	8,111,696	6,726,452
Selling, etc., expense	745,202	687,647
Oper. profit	2,334,686	98,528
Other income	†202,584	42,064
Total income	2,537,270	140,592
Interest	62,935	104,812
Aband. loss	234,213	27,871
Other deduct.	66,137	30,570
Fed. inc. tax	836,672	54,223
Inc. tax adj.	.....	‡cr 165,216
**Net profit	1,337,313	88,332
Pfd. divs.	687,168	.....
Com. divs.	.....	.....
Surp. for period	650,145	88,332
Prev. earn. surp.	1,520,524	1,432,192
Earn. surplus	2,170,669	1,520,524
Earn., com. share	$2.43	$0.16

*Includes Glacier Sand & Gravel Co. for 4 mos. to Aug. 31, 1947 and years ended Apr. 30, 1947 and 1946, respectively.

†Includes $84,413 settlement of claim arising from cancelled sales contracts.

‡Refundable under carry-back provisions.

**After deprec., depletion, etc.: Aug. 31, 1947, $247,223; Jan. 31, 1947, $446,961; Jan. 31, 1946, $1,181,409.

LEHIGH PORTLAND CEMENT CO., Allentown, Penn.; Alpha Portland Cement Co., Easton, Penn.; and Nazareth Cement Co., Nazareth, Penn., have announced an increase in bulk cement prices, effective now, of 15¢ a barrel in the Philadelphia area and 10¢ a barrel in the Hudson Valley and New England regions. The price of cement packed in paper bags has been increased 3¢ more than bulk shipments.

GIANT PORTLAND CEMENT CO., Philadelphia, Penn., has published the following statement of income for the year ended December 31, 1946:

Earnings	Year to Dec. 31, '46
Net sales	$2,305,750
Cost of sales	1,731,437
Selling, etc., expense	261,216
Operating profit	313,097
Other income, net	3,458
Total income	316,555
Loss, assets sold	15,276
Income taxes	122,600
Net income	178,679
Earned per share	$0.63
No. of shares	282,453

Stockholders recently voted on a proposal to increase authorized $1 par common stock from 300,000 to 1,200,000 shares. Holders of outstanding 282,453 shares would be offered additional common stock to provide the company with approximately $1,000,000, part of which would be used to convert the new plant at Harleyville, S. C.

IDEAL CEMENT CO., Denver, Colo., recently declared a dividend of 40¢ per share payable December 31, bringing the total for 1947 to $1.60, as compared with $1.25 for 1946. Cris Dobbins, company president, said that shipments are running approximately 12 per cent ahead of 1946.

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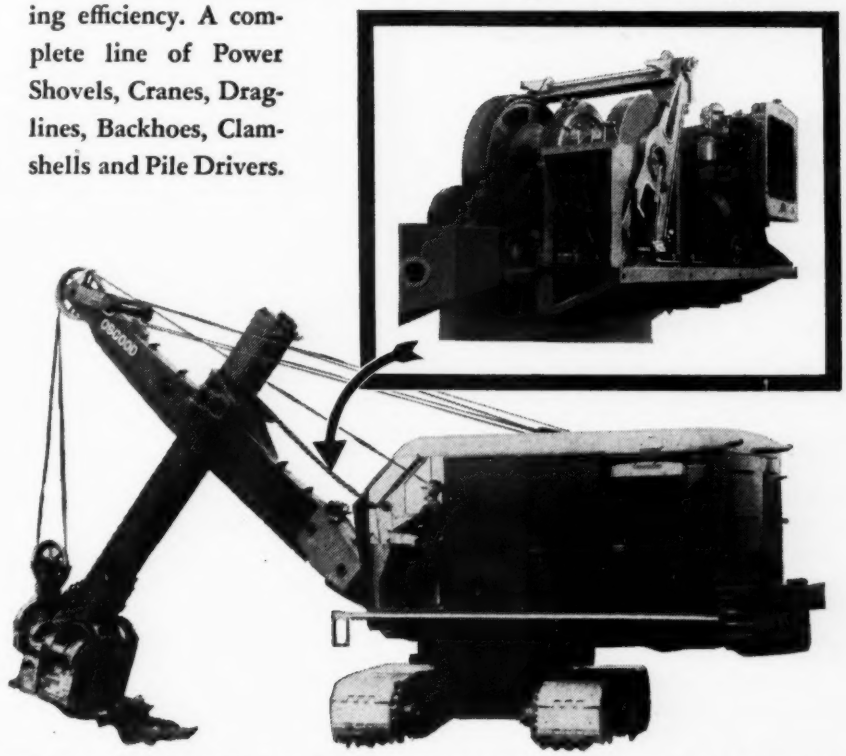

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Steel Clad
Non-Rotating

The Service Record of this wire rope continues to make and hold friends.

MADE ONLY BY

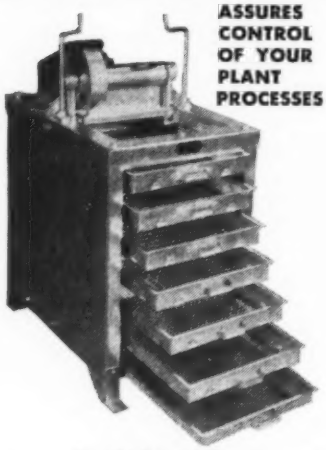
A. LESCHEN & SONS ROPE CO.

Established 1857

5909 Kennerly Avenue St. Louis, Mo.

New York — Chicago — Denver
San Francisco — Portland — Seattle

GILSON
MECHANICAL TESTING SCREEN



ASSURES CONTROL OF YOUR PLANT PROCESSES

8 GILSON FEATURES

- Makes tests quickly and accurately
- Two to seven separations simultaneously
- One machine for the entire size range
- Screen trays independently removable
- Trays adjusted to same tare weight
- Visible separation to refusal
- Few moving parts to wear out
- Engineered for long and practical service

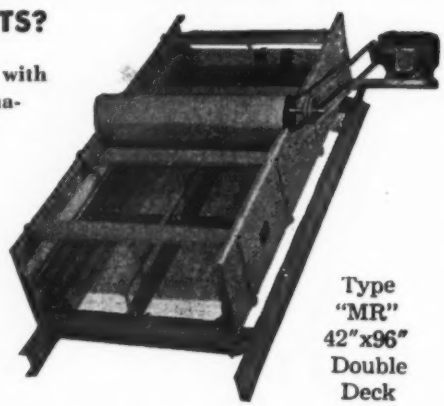
Let us send you complete information.

GILSON SCREEN COMPANY
BOX 186 MERCER, PA.

WHY GAMBLE WITH RESULTS?

Take the hit-or-miss out of Screening with a UNIVERSAL! Every part of this machine has been designed to give the operator less expense and more productive efficiency.

Write for catalog No. 107 today, and discover why hundreds of operators have profited by screening the UNIVERSAL way.

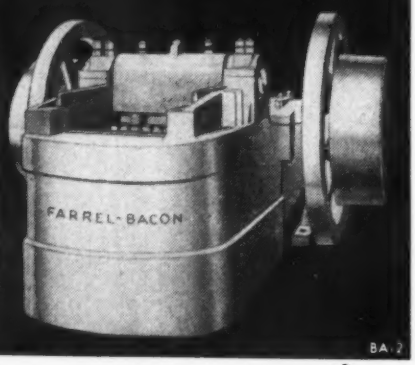


Type "MR" 42"x96" Double Deck

★ ★ ★ **UNIVERSAL VIBRATING SCREEN CO.** ★ ★ ★
RACINE — WISCONSIN

LONGER PRODUCING LIFE BUILT INTO
FARREL-BACON CRUSHERS

Permanent strength and operating efficiency is engineered into these crushers at every vital point. Farrel-Bacon will provide industrial units or completely designed and equipped plants, including screens, elevators and conveyors. Also other types of mine, quarry, sand and gravel plant machinery. *Write for complete information.*



FARREL-BACON
ANSONIA, CONNECTICUT

BA-2

OHIO RIVER SAND CO., Louisville, Ky., has approved a proposed reorganization plan providing for exchange of 7½ shares of new $20 par 6 per cent convertible preferred stock for each present $100 par 7 per cent first preferred share and $50 accrued dividends thereon; 2 shares of new common stock for each present $50 par 6 per cent convertible second preferred share and accrued dividends, and one-tenth share of new common for each present common share.

MAULE INDUSTRIES, INC., Miami, Fla., has announced the following earnings for the five months' period ended September 30, 1947, and the four months' period ended April 30, 1947:

Earnings	5 mos to Sept. 30, '47	*4 mos. to Apr. 30, '47
Net sales	$2,818,669	$1,664,350
Cost of sales	1,229,583	635,862
Depreciation	64,804	31,236
Depletion	4,360	2,989
Oper. expense	992,302	705,601
Oper. profit	527,621	288,663
Other income	9,207	11,714
Total income	536,828	300,377
Bond interest	20,833	
Other deduct.		
Income taxes	196,078	
†Net profit	319,917	‡300,377

*Partnership.

†Excludes gain from sale of capital assets: Sept., $2,738; Apr., $154,505; Dec., $138,873.

‡Had partnership been a corporation and income taxes computed on a corporate basis, at 38 per cent, net profit would be: Apr., $186,233; Dec., $156,396.

CALAVERAS CEMENT CO., San Francisco, Calif., has reported that 14,634 shares of prior preferred and 1379 shares of 7 per cent cumulative stock now are outstanding, following exchange of some of the 7 per cent stock for prior preferred.

Correction

THE FINANCIAL REPORT of the National Gypsum Co., Buffalo, N. Y., for the nine months period ended September 30, 1947, was given incorrectly in the December, 1947, issue of ROCK PRODUCTS. It should have read as follows:

	3 Months Ended 9/30/47	9 Months Ended 9/30/47
Gross sales less discounts, returns and allowances	$13,087,261	$37,085,730
Cost of goods sold	9,767,723	27,455,915
Gross profit	$ 3,319,538	$ 9,629,815
Selling, administrative and general expenses	1,199,424	3,482,695
Operating profit	$ 2,120,114	$ 6,147,120
Other income:		
Interest earned	19,429	82,472
Marine operations	284	274,537
Sundry	35,903	47,084
	$ 55,616	$ 404,093
Other deductions:		
Interest on funded debt	83,254	221,362
Provision for doubtful accounts	35,701	100,828
Sundry	55,461	133,263
	$ 174,416	$ 455,453
Profit before taxes on income	$ 2,001,314	$ 6,095,760
Provision for income taxes	791,000	2,354,000
Net profit	$ 1,210,314	$ 3,741,760

Provision for depletion, depreciation and amortization included above amounts to $349,707 for the 3 months ended September 30, 1947, and $1,017,306 for the 9 months ended September 30, 1947.

Manufacturers' News

Lincoln Electric Co., Cleveland, Ohio, has appointed G. E. Tenney as service manager to direct the policies and operations of a newly expanded service department.

Air Reduction Co., Inc., New York, N. Y., has announced the appointment of Thomas B. Hasler, formerly president of Wilson Welder & Metals Co., Inc., a subsidiary, as chairman of the board of directors, succeeding C. E. Adams who has resigned as chairman and director. F. B. Adams, Jr., was elected president and a director, in addition to the position of director of apparatus research and production.

American Hoist & Derrick Co., St. Paul, Minn., has promoted Joseph J. Hite to assistant chief engineer. He formerly held the position of development engineer and more recently of office engineer. Robert C. Dunbar has been appointed West Coast representative for the small products division, and Percy S. Gough has been made manager of distributor sales division.

American Brake Shoe Co., New York, N. Y., has elected William T. Kelly, Jr., as first vice-president of the American Brakeblok Division. He has served as vice-president of the company since 1946 and, in addition to his new duties, will continue as president of the Kellogg and Engineered Castings Divisions.

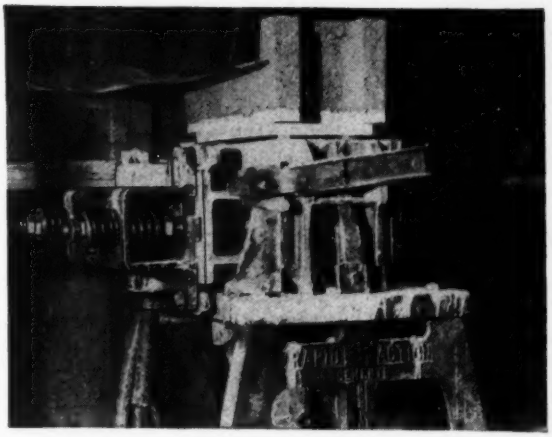
Master Builders Co., Cleveland, Ohio, has appointed Dr. Fred E. Kendall as director of research. He will be head of the laboratory working with Dr. E. W. Scripture, Jr., vice-president in charge of research.

Central Bag & Burlap Co., Chicago, Ill., has announced the appointment of John R. Clements as sales manager. Formerly with the Chicago office of the Bemis Bro. Bag Co., Mr. Clements has been in the bag business for 15 years and is well known in the industry. He will have complete charge of sales for the company's plants in Chicago and Burlington, Iowa.

John R. Clements

DeLaval Steam Turbine Co., Trenton, N. J., has announced the retirement of J. W. Hertzler, manager of the worm gear division, after 23 years of service with the company. W. A. Reynolds, manager of the IMO rotary pump division, has been appointed manager of the combined IMO pump and worm gear divisions.

Bemis Bro. Bag Co., St. Louis, Mo., has appointed Elwood M. Proctor as manager of the plant at Seattle, Wash., replacing E. J. Gregg, who died recently. Robert Highley has been appointed manager of the New York general sales division.



NOW YOU CAN ADD

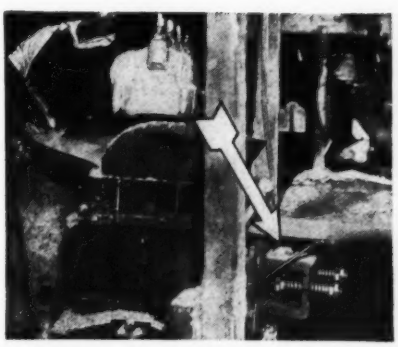
"Vibration"

To Your Hand or Power Block Machine with

SYNTRON

"Pulsating Magnet"

ELECTRIC VIBRATORS



3600 powerful, pulsating vibrations per minute will produce a denser, stronger block and improve its appearance.

Applied to either the mold box or the pallet depending upon the design of the machine.

The illustrations show a Model V-75 mounted on a hand machine — and a Model V-500 on a power machine.

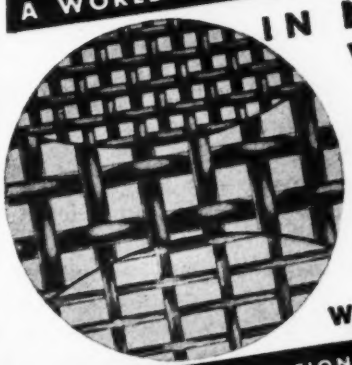
Investigate their advantages, write to

SYNTRON CO.

450 Lexington Homer City, Pa.

JOIN 11,300 PRODUCERS WHO REGULARLY READ ROCK PRODUCTS

Industry has A WORLD OF CONFIDENCE IN NAT-ALOY WIRE CLOTH



COVERS EVERY REQUIREMENT

. . . for a dependable, long-wearing, non-crystalizing Screen Cloth. Has "Nat-Aloy" Lock Crimp Meshes. Preferred for screening accuracy, economy and serviceability. All Sizes — All Meshes — All Gauges.

Write for Catalog No. 55

NATIONAL WIRE CLOTH CO., INC.
St. Paul, Minn.

OVER 1000 Installations in cement plants!

PYRASTEEL SEGMENTAL KILN ENDS

In the past 20 years over 1000 PYRASTEEL Kiln Ends have been installed. Some have lasted for 14 years without a failure — 6 to 8 years' service is quite common.

About 165 million barrels of cement — over 76% of the annual output — is produced in plants using either or both of our alloys, PYRASTEEL and EVANSTEEL.

PYRASTEEL is equally effective and economical in other high-heat applications, such as conveyor screws, feed pipes, clinker coolers, drag chains, and cement cooling equipment.

You can't beat this performance of PYRASTEEL Kiln Ends for avoiding burnouts and shutdowns, and insuring continuous production with low cost maintenance.

Unit Segments are easy to install or replace.

Write for PYRASTEEL Bulletin.

CHICAGO STEEL FOUNDRY COMPANY

PYRASTEEL for high temperatures

KEDZIE AVE & 37TH ST.
CHICAGO 32, ILL.
Makers of Alloy Steel for 35 Years

EVANSTEEL for strength

Handle Material Faster and Cheaper with a SAUERMAN SCRAPER or CABLEWAY

POWER DRAG SCRAPER

SLACKLINE CABLEWAY

With a Sauerman Power Drag Scraper you can make easy work of many excavating and material handling jobs that would be difficult and costly by any other method.

A Sauerman machine can be installed to reach across a pit, pond, river or stockpile, or up to the top of a hill. It moves material at high speed, anywhere within its wide radius.

Digging, hauling and automatic dumping are merged into one operation controlled by one operator. Power requirement is moderate. Maintenance is simple.

Send for Sauerman Catalog and money-saving ideas

SAUERMAN BROS., Inc.

530 South Clinton St. **Chicago 7, Illinois**

Caterpillar Tractor Co., Peoria, Ill., has appointed E. E. Witt as special representative in construction and industrial sales in the Western Division, with headquarters in San Leandro, Calif. Kenneth F. Ames, Russell S. Cornell and Truman E. Sage, have been named assistant sales managers of the Central, Eastern and Western sales divisions, respectively.

Chevrolet Motor Division, Detroit, Mich., has announced the appointment of Ivan X. Sarvis as assistant general sales manager. He was formerly regional manager at Dallas, Texas.

Chain Belt Co., Milwaukee, Wis., announces the election of B. F. Devine as a vice-president of the company. He joined the organization in 1909 and has devoted all his time since then to the construction machinery industry. He served as sales manager and later manager of the construction machinery division, and will continue his duties as manager of that division. L. B. McKnight, who started in 1927, has been elected executive vice-president of the conveyor and process equipment and the construction machinery divisions. Mr. McKnight was executive assistant to the president. O. W. Carpenter, formerly secretary-treasurer, has been elected vice-president in charge of finance. Fred C. Wilcox, an authority on ready mixed concrete plant equipment since 1928, has been appointed New York manager of Moto-Mixer and Moto-Agitator sales of the company. Announcement has also been made of the appointment of Edward Ehrbar, Inc., Brooklyn, N. Y., as distributor of Rex Moto-Mixers in the city of New York, Long Island and the counties of Sullivan, Ulster, Dutchess, Orange, Putnam and Westchester, and Dale & Rankin, Inc., Newark, N. J., for the northern half of New Jersey.

B. F. Devine

General Electric Co., Schenectady, N. Y., announces the election of Henry V. Erben as vice-president and general manager of the apparatus department to succeed Roy C. Muir, who has retired after more than 42 years of service. John D. Lockton has been named treasurer, succeeding Jesse W. Lewis of New York, who has also retired, after more than 37 years' service.

International Harvester Co., Chicago, Ill., has announced the appointment of J. P. Feyan, formerly retail truck manager at Fresno, Calif., to assistant manager at Spokane, Wash., also the appointment of E. P. O'Connor as assistant branch manager of the Minneapolis motor truck branch. Merion Young has been promoted to asistant manager at the Seattle motor truck branch. He was formerly retail truck manager at Portland, Ore.

Smith Engineering Works, Milwaukee, Wis., announces the appointment of Samuel A. Madrid as Western representative covering all states west of and including Montana, Wyoming, Colorado and New Mexico.

Linde Air Products Co., New York, N. Y., unit of Union Carbide & Carbon Corp., will soon start construction on an oxygen filling station and acetylene producing plant at Little Rock, Ark.

The Buda Co., Harvey, Ill., announces that the Andrews Agency, Milwaukee, Wis., will henceforth handle engine and generator set advertising, and Russell T. Gray, Inc., Chicago, Ill., will continue to handle the railroad and industrial product advertising.

Nordberg Mfg. Co., Milwaukee, Wis., has appointed Howard L. Phillips as assistant export manager. Mr. Phillips served for eight years as Far Eastern representative of Worthington Pump & Machinery Corp., with headquarters in Manila, P. I.

Coast Equipment Co., San Francisco, Calif., announces that the company is now a division of the Nosman Equipment Co., a California corporation, but will continue under the name of Coast Equipment Co. Byron G. Walker will be manager, succeeding Fritz M. Awalt who recently resigned to assume ownership of Western Crane Service, Berkeley, Calif. Paul R. Egli has been appointed assistant manager, and James C. Frush has been named sales manager. Other additions include George R. Planz, Gene Curry, Johnny Gillette and Johnny Quartarolo.

Hyster Co., Danville, Ill., recently held a sales conference of the industrial truck division which was attended by 175 people, including dealers from China, the Netherlands, and Brazil. Sessions included equipment displays and talks by E. G. Swigert, president; and Eugene Caldwell, general manager.

Air Reduction Co., New York, N. Y., has formed a new subsidiary, the Air Reduction Pacific Co., with headquarters in San Francisco, Calif. H. P. Etter, formerly sales manager of the Pacific Coast division, will be president and director. Other directors will be C. D. Gibson, G. E. Harkins, J. A. Hill, C. G. Andrew and W. C. Keeley, who will also serve as chairman of the board.

Bailey Meter Co., Cleveland, Ohio, has opened branch offices in New Orleans, La., and Schenectady, N. Y., S. G. Dukelow is manager of the New Orleans office, assisted by J. M. Bevan, service engineer. J. F. Luhrs is manager in New York. G. R. Mays has been appointed manager of the St. Louis office, succeeding L. E. Evans who has resigned.

Joseph T. Ryerson & Son, Inc., Chicago, Ill., has announced the appointment of Alfred J. Olson as assistant sales manager of the Chicago plant. He succeeds Ray C. Page who was recently named sales manager of the new steel service plant under construction in the San Francisco area.

MACWHYTE WIRE ROPE

is correct for Rock Product operations

Use MONARCH Whyte Strand Internally Lubricated, PREformed Wire Rope... YOUR BEST BUY!

When you use the correct wire rope, both the rope and your equipment last longer, cost less to operate. Macwhyte engineers and distributors are at your service to give you the correct wire rope for your equipment.

A useful wire rope handbook and buyers' guide will be sent to you on request. Ask your Macwhyte distributor or write Macwhyte Company for Catalog G-15.

NO. 903

MACWHYTE WIRE ROPE
Manufactured by Macwhyte Company
2949 Fourteenth Ave., Kenosha, Wis.
Mill Depots: New York · Pittsburgh · Chicago
Minneapolis · Fort Worth · Portland · Seattle · San Francisco
Los Angeles · Distributors throughout the U. S. A. and other countries

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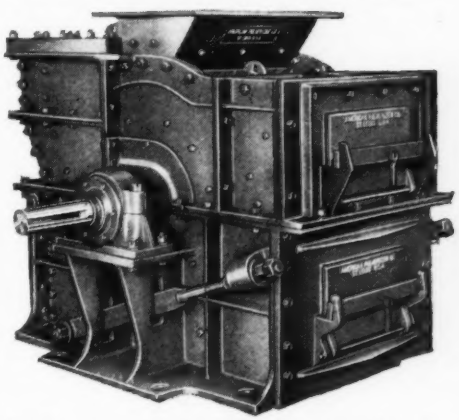
There's an AMERICAN to fit Your Particular Needs--



with the right Hammer Action to fit the Job--

"Brute" "Broadhead" "Splitter"

Since every job is different, Americans are not "all purpose" crushers . . . they are specifically engineered to the highest possible efficiency for each particular quarry operation. The American "ACS" can be fitted with regular or special hammers for the type of reduction required. It can also be furnished with conventional front feed for minimum fines or center feed for a finer product and a maximum amount of fines. Hopper opening is centered over rotor . . . it gives utilization of upper grinding chamber plus longer travel in hammer circle. Easy external adjustments give individual size control and flexibility. Capacities up to 250 TPH of limestone.

Send for bulletin: "Better Stone Crushing"

American PULVERIZER COMPANY

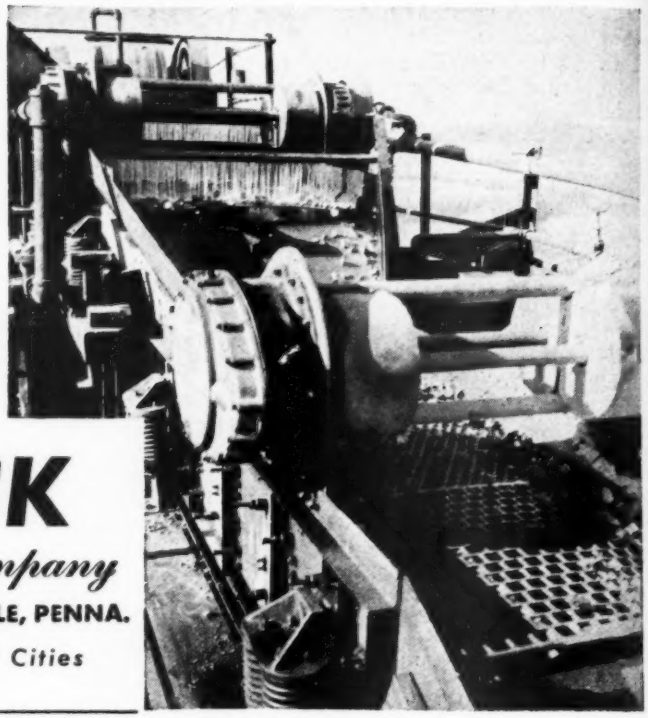
Originators and Manufacturers of Ring Crushers and Pulverizers

1245 MACKLIND AVE. ST. LOUIS, 10, MO.

HENDRICK PERFORATED METAL PLATE
...on Robins Eliptex Screen

Here is a Robins Eliptex Vibrating Screen equipped with a Hendrick perforated metal deck. The three-way motion of this well-known screen, plus the accuracy of Hendrick perforations, assures sharp sizing, high capacity and freedom from blinding.

Toughened by an exclusive Hendrick heat-treatment process, Hendrick perforated metal plate withstands abrasion and maintains uniformity of mesh throughout unusually long service life. It is furnished in any desired gauge and size of openings to meet specific requirements. Write for detailed information.



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Manufacturing Company

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Perforated Metal Screens
Architectural Grilles
Mitco Open Steel Flooring,
"Shur-Site" Treads and
Armorgrids

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UNIT...tops them all!

For sheer ruggedness, speed and all-around dependability, you just can't beat a UNIT Excavator. UNIT is nimble, sturdy, fast . . . Famous UNIT one-piece cast case provides perfect alignment of all working parts. Other exclusive UNIT features include: Automatic traction brakes . . . Straight line engine mounting . . . Drop forged alloy steel gears . . . Splined shafts . . . Disc type clutches. Convertible.

½ and ¾ YD. EXCAVATORS
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New FULL VISION Cab provides maximum visibility. Operator can see in ALL directions. Promotes safety. Increases efficiency.

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HAMMOND
MULTI-WALL BAGS
. . . moisture-proof plies give
EXTRA PROTECTION
Maximum protection against rain, snow, sleet or leaky cars is assured when you use Hammond Multi-Wall Bags. Special moisture-proof plies safeguard your products requiring extra protection, and minimize your shipping problems.
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Distributors in Pennsylvania for

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PORTABLE GRAVEL PLANTS
SCREENS & CRUSHERS
HAMMERMILLS
FEEDERS & BINS
ROLL CRUSHERS
JAW CRUSHERS

PORTABLE AND STATIONARY

BELT CONVEYORS — BUCKET ELEVATORS
CONVEYOR ROLLS — QUARRY PLANTS

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At Thomas Blvd.
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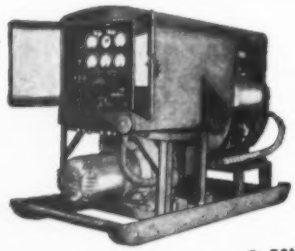
NOW! the POWER UNITS with the THREE WAY ECONOMY

4 KW OIL ENGINE GENERATOR

NEW! For immediate delivery!



- 4 KW
- 2 PHASE
- 60/50 CYCLES
- 120 VOLTS
- 1800 R.P.M.
- 1200 LBS. NET WT.

• 70" Long, 50" High, 35" Wide

1. *save on* . . . FUEL— using regular inexpensive fuel oil.
2. *save on* . . . COST— units are war surplus priced for quick sale.
3. *save on* . . . SPACE— engine and generator are in one compact unit with self-contained control panel.

WRITE, WIRE, PHONE DEPT. MH FOR FULL SPECIFICATIONS AND LOW PRICES

BENJAMIN'S FOR MOTORS

MILL AVENUE & AVENUE U • BROOKLYN, N. Y.

Recipe for Excellent WEAR-RESISTANCE

AND HIGH IMPACT

When you need SELF-HARDENING ALLOYS

Many users of wear-resisting alloys have found ISOROD the most efficient alloy where *high impact* is combined with *abrasion* such as is encountered on power shovel teeth and dragline buckets.

ISOROD gives nearly three times the wear of competitive alloys in the self-hardening class, resists higher impact and will not chip or spall off under severe use, even on manganese steel.

It is a favorite with a host of quarries because it is easy to apply, has a low spatter loss, has a very stable arc, can be applied at the rate of 9 lbs. per hour using ¼" electrode and is exceedingly tough. Available in sizes from 3/32" to ¼" diameters.

RESISTO - LOY CO.

Grand Rapids 7, Mich.

WHY THE NEW LEADER LIME SPREADER IS FIRST CHOICE FOR PROFITABLE SPREADING

- Twin distributor discs cast uniform spread. No thick and thin spots. Save time and material.
- Steep sloping sides with extra wide bottom assure free flow even when material is wet.
- Operates in any weather. Hopper made of wood prevents freezing to sides.
- Built to stay on the job with welded steel frame, steel cut gears, and heavy-duty construction for long, trouble-free life.
- 9, 11, 13, and 15 ft. lengths to fit any truck chassis.

When not spreading lime you can use the New Leader for hauling sand, gravel, chips and small rock for construction jobs, driveways, etc.

Write for Full Information

HIGHWAY EQUIPMENT CO., INC.

604 D AVENUE N. W. CEDAR RAPIDS, IOWA

Manufacturers of the World's Most Complete Line of Spreaders

BUCKETS FOR EVERY SERVICE FROM A TO Z

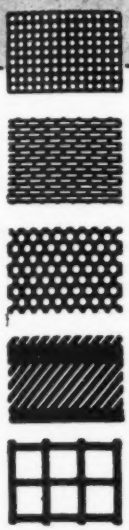
Because Blaw-Knox builds hundreds of different types and sizes, you can *specify* the bucket which exactly meets your requirements and find it pictured and described in one of our specialized bucket catalogs . . . Write us concerning what you plan to dig or rehandle, crane capacity and clearances, and we will forward the catalog which makes it easy for you to select the most efficient bucket for the job.

BLAW-KNOX DIVISION of Blaw-Knox Company

2035 Farmers Bank Bldg., Pittsburgh, Pa.

BLAW-KNOX CLAMSHELL BUCKETS

Perforated Metals



REMEMBER—for screening, guarding, ventilating, etc., **Perforated Metals** are stronger, dependably accurate longer and insure long-range economy.

REMEMBER also—that H & K offers you 65 years accumulated experience in precision perforating of metals, as well as plywoods, plastics, fabrikoids and other materials. H & K, too, offers you a wide selection of sizes, shapes and spacings. Send your specifications NOW for complete information.

Don't Forget—H&K "Make Your Own" Safety Guards . . . strong, safe, inexpensive. Ask about them!

The Harrington & King Perforating Co.

5650 Fillmore St., Chicago 44, Ill. • 114 Liberty St., N. Y. 6, N. Y.

Here are two proven reasons why so many operators move solids with GIW PUMPS...

EFFICIENCY

SIMPLICITY

GEORGIA IRON WORKS CO.
EST. 1891

PHONE 4-1428 P.O. 1128 AUGUSTA, GEORGIA

There's more speed in a pair of 4″ wagon drills than you'll ever get with a 500 ft. compressor.

With the 100 additional cubic feet of air from a Jaeger Model 600 you can keep both drills at top efficiency and also power a hand-held drill for secondary work.

Adds up to 20% to 30% more daily footage with the same tools and crew — the lowest cost drilling you have ever done.

600 cubic feet of Wallop!

Whether the job requires 60 or 600 c.f.m. of air, companies that know their costs are using "AIR PLUS" precision-built compressors — for fuel economy (Jaeger "Fuel Miser" speed control alone saves up to 32%) — for a steadier supply of cooler air (30% to 50% larger receiver capacity and 100% efficient intercooling) — for a bigger daily output of work and less upkeep cost than any compressor you have ever owned.

Tops in service, too — distributors in 130 cities sell, rent and service "AIR PLUS" Compressors. See your Jaeger dealer.

THE JAEGER MACHINE CO.

Main Office and Factory — Columbus 16, Ohio

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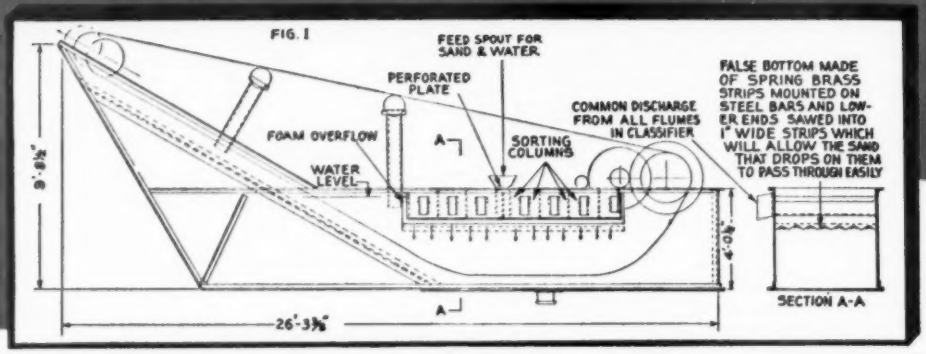
FIG. 1
FEED SPOUT FOR SAND & WATER
PERFORATED PLATE
FOAM OVERFLOW
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* See articles in the June and September, 1947 Rock Products on the Webster Hydraulic Classifier and proper sand classification.

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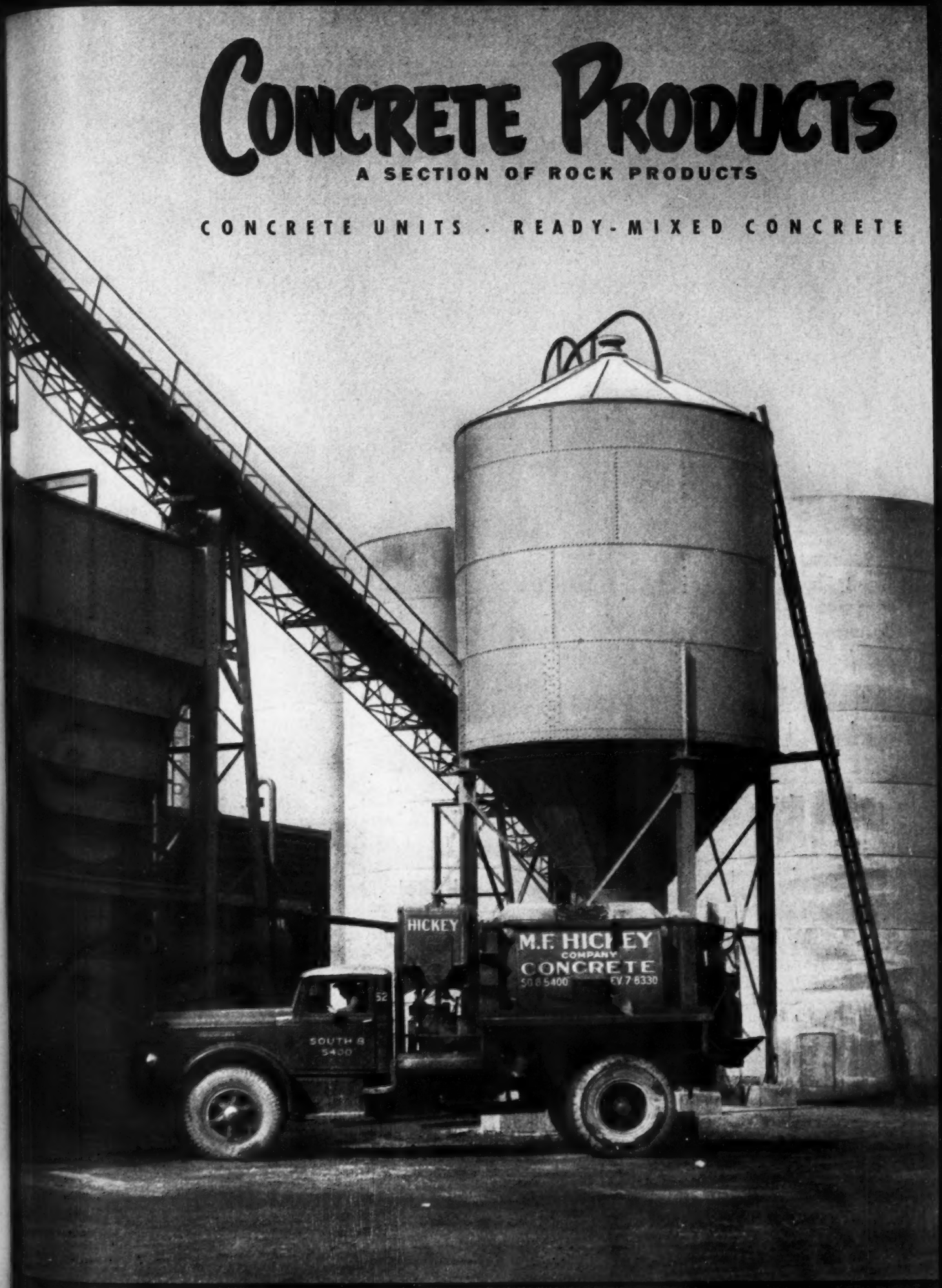
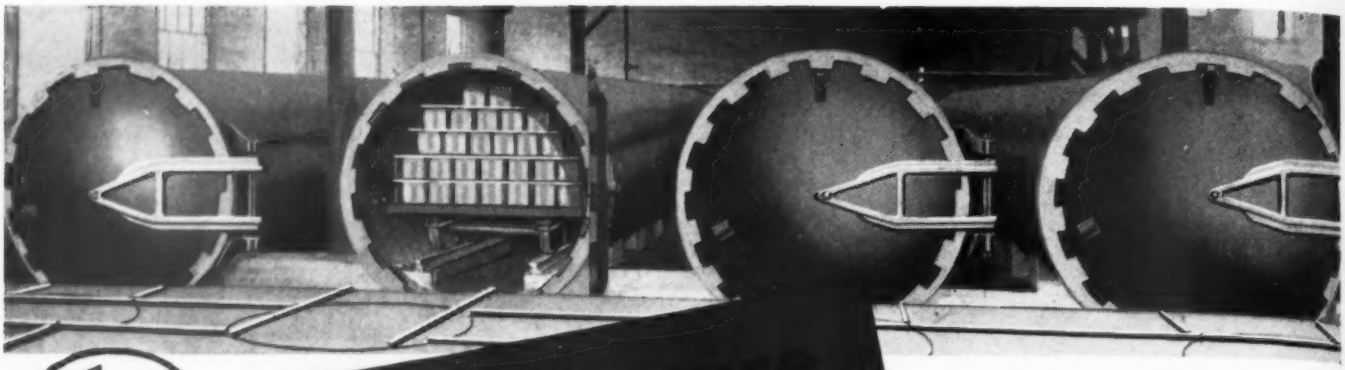


...ATCHING PLANT OF METROPOLITAN SAND AND ...



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does 10 years work in 12 to 15 hours

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Architects all over the country are beginning to specify high pressure curing because of **product superiority alone.**

Manufacturers who have installed J & C equipment **use less cement for a better product,** and eliminate **handling costs** and capital outlay for **storage space and material stock piles.** The over-all savings normally amount to from 15 to 25% as compared with costs for the **old-fashioned time-and-weather curing.**

To duplicate the curing effect that **J & C achieves in 12 to 15 hours,** would require **ten years under ordinary methods.**

For complete details concerning J & C High Pressure Curing equipment . . . **write us today** . . . at Saginaw.

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INDUSTRY NEWS

New Color Process For Concrete Block

DAN PATTERSON, Franklin, Ind., has developed a process for the mass production of building block in any color or color combination and also in 50 different designs all of which are incorporated in the concrete itself and not painted on.

Announcement of the process followed two years of experimentation by Patterson and Ira Robinson, and a quantity of the new color blocks already has been turned out at the Patterson plant. The price of the colored block will be approximately twice the price of standard concrete block, Patterson said.

Buy Clay Products Co.

B. MIFFLIN HOOD CO., Daisey, Tenn., specializing in the manufacture of burnt clay products, chemical stoneware and concrete block, has been purchased by a group headed by Sam J. McAlester. The new group of officers includes: Sam J. McAlester, president; Hayden P. Grant, executive vice-president and secretary; Sam J. McAlester, Jr., vice-president; Spears McAlester, assistant secretary-treasurer; T. L. Keith, production manager; and T. V. Scott, plant superintendent.

Operates Gravel Pit and Ready-Mix Plant Jointly

SHELL ROCK GRAVEL CO., Shell Rock, Iowa, operates a ready mixed concrete plant in conjunction with its sand and gravel plant. The ready-mix plant takes all the gravel the pit produces, plus almost all the gravel produced by a second pit in the vicinity. Capacity of the ready mixed concrete plant, which opened last Summer, is 60-cu. yd. per day. In addition to concrete, the company markets an agricultural limestone from its pit.

Stone for Ready Mix

J. B. & R. E. WALKER, INC., plan to start operation of a new rock crushing plant near Salt Lake City, Utah, around the first of the year. Rated at 350 t.p.h., the new plant will supply the firm's ready mixed concrete plant as well as provide a surplus for other outlets. The project will cost an estimated $150,000. Storage space is to be provided for 100,000 tons of processed material with reclaiming-tunnel, belt-conveyor recovery.

Expect Block Sale Increase

ANCHOR CONCRETE PRODUCTS, INC., Cheektowaga, N. Y., is making plans for a 50 per cent increase in block sales this year over 1947, according to F. W. Reinhold, president. The company's new plant was completed at a cost of $350,000, and an addition, costing $85,000, is nearing completion. It is expected that $50,000 will be spent during the early part of the year for trucks and other transportation facilities.

The company will employ a second shift during the Winter in order to build up stockpiles of block to meet the increased building activity due in Spring. It is anticipated that the second shift will be necessary during this year in order to meet demand. The company now employs 75 men, but this number will be increased to about 90 by March.

Perlite Expansion Progress

ALEXITE ENGINEERING DIVISION, Alexander Film Co., Colorado Springs, Colo., announces through its president, J. Don Alexander, that after six years of experimental work the company has now opened a perlite mine in southern Colorado. Peralex, trade name for this lightweight aggregate, ranges from 7- to 15-lb. per cu. ft., depending on grain size.

Natural, graded perlite, left; and expanded "Peralex," right

Expanded perlite will be shipped throughout Colorado and adjoining states, with unexpanded but graded perlite ore shipped greater distances due to the more favorable freight rate for the heavier material. The Alexite Co. has built and experimented with several different furnaces for expansion of the ore and is now ready to offer complete machinery and operating data to producers in the ore shipping radius. Still subject to improvement, the present furnace being used is of the rotary type. Expansion of this ore produces an excess of fines, for which several economically feasible outlets have already been found.

Cement Prices Upped

HIGHER CEMENT prices have been listed by producers east of the Mississippi, with percentages being spotty rather than a blanket increase. Higher operating cost in general plus increased freight and paper bag rates in particular were given as reason for the increases. Among mills notifying the trade of higher prices are Alpha Portland Cement Co., Easton, Penn., for all its areas served except Chicago; Lehigh Portland Cement Co., Allentown, Penn.; Marquette Cement Manufacturing Co., Chicago, Ill.; and Pennsylvania-Dixie Cement Co., New York, N. Y.

WATERLOO CEMENT CO., INC., Waterloo, Iowa, has been incorporated with a capital of $100,000 to engage in the manufacture of cement, concrete, metal and wood products. C. L. Douthett, Gordon A. Spray and A. A. Zimmerman are principals.

H. E. MORRISON BLOCK PLANT, Princeton, W. Va., has been organized to engage in the construction material supply business with a capital of $10,000. H. E. Morrison, Lella M. Morrison and C. Frank Wright, Jr., are the incorporators.

MARIETTA CONCRETE CORP., Marietta, Ohio, has purchased approximately five acres of land adjoining its Plant No. 1 to provide for further expansion of the building material division, Frank L. Christy, president, has announced.

J. C. DELL, who organized a concrete block company at Staunton, Va., in the latter part of 1946, is now specializing in the manufacture of the "Wilbert" burial vault and "pre-cast" septic tanks. Other products being manufactured include garden furniture such as bird baths, sun dials, and benches. Plans also are being made for the manufacture of "cast-in-place" silos.

MICKELSON CONCRETE PRODUCTS, INC., Austin, Minn., has filed articles of incorporation listing Ervin A. Mickelson, Irene Mickelson, Harland H. Sorenson and Esther Sorenson as principals.

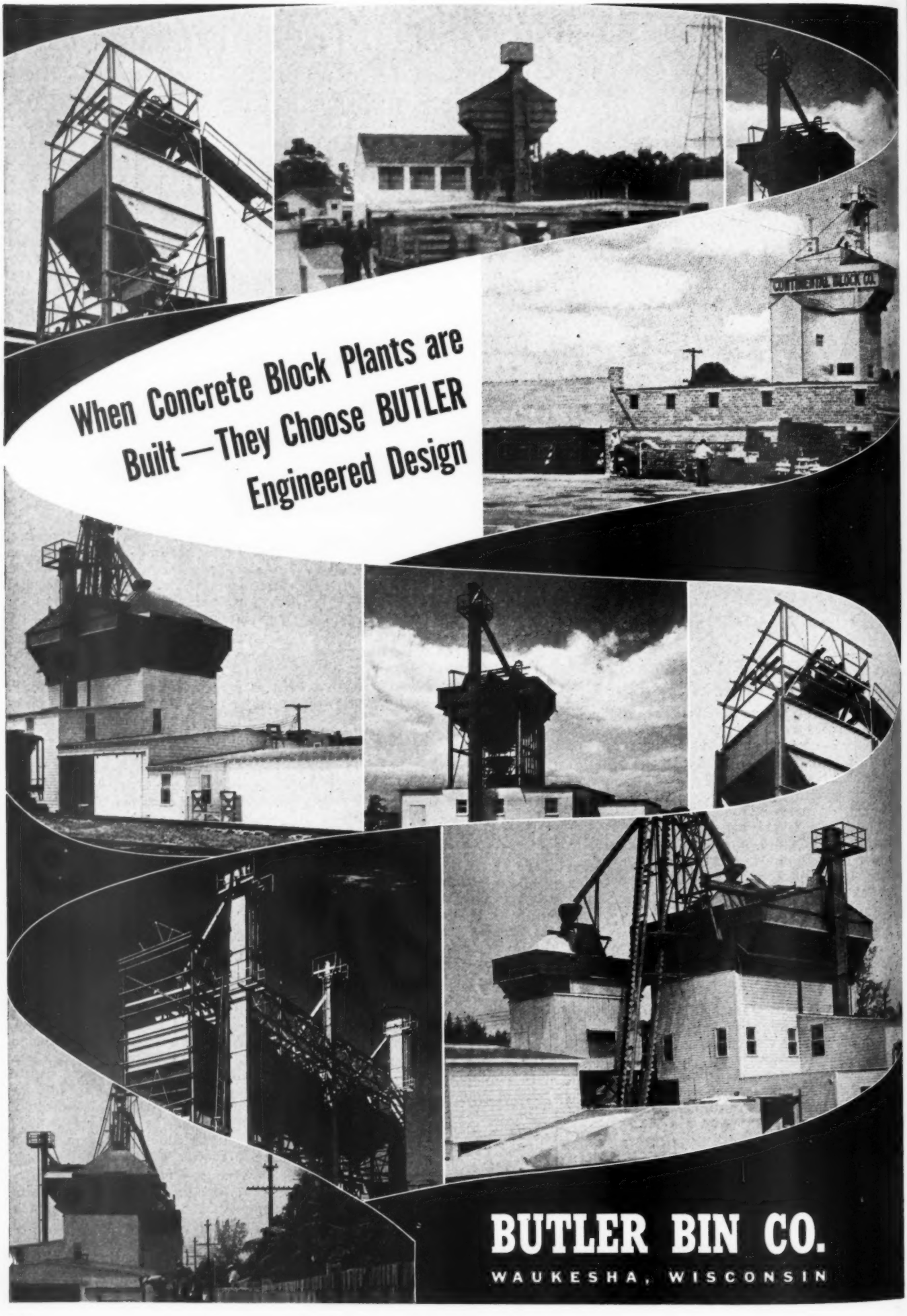
LISTER CONCRETE PRODUCTS CO., Des Moines, Iowa, has started the manufacture of concrete steps, lawn fixtures and farm items with Glenn T. Lister as president and general manager. The steps are made with safety tread, in several sizes. Hand rails also are available. Lawn fixtures include vases, urns, benches, bird baths, sun dials and stepping stones. Also produced are septic tanks, hog troughs, pier blocks and chimney caps.

LONGVIEW SAND AND GRAVEL CO., Longview, Texas, manufacturer of transit ready mixed cement, has begun official operations, using three Jaeger transit mix trucks. Mr. and Mrs. Luther Johnston and Aubrey Johnston own and operate the business.

PAUL MCALLISTER has announced the opening of a concrete block plant at Marion, Ohio, with a capacity of approximately 3000 block per day.

ARROWCRETE CORP., Columbus, Ohio, has received from Washington formal F.H.A. approval of its new product, Flexicore steel reinforced concrete roof and floor slabs for dwelling, institutional and industrial construction. Production at the new $60,000 plant was scheduled for January on slabs in lengths up to 22½ ft.

WILSON CONCRETE BLOCK AND SUPPLY CO., Indianapolis, Ind., has been opened by Wilbur G. Wilson with a capacity of 1000 block per day, and plans to add stone trim, waterproofing paints, and similar lines to its merchandising program. O. M. Moore is factory superintendent.


When Concrete Block Plants are Built—They Choose BUTLER Engineered Design
BUTLER BIN CO.
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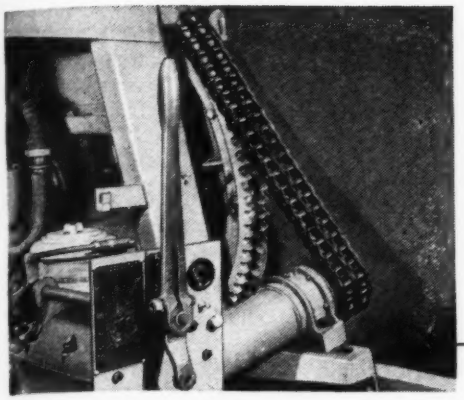
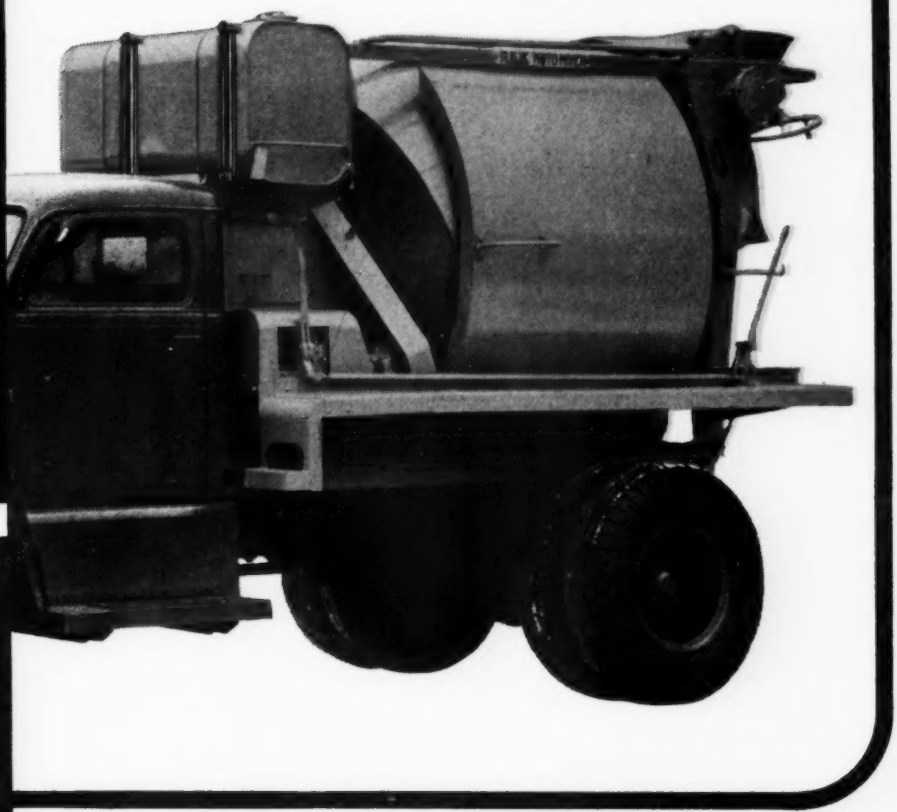
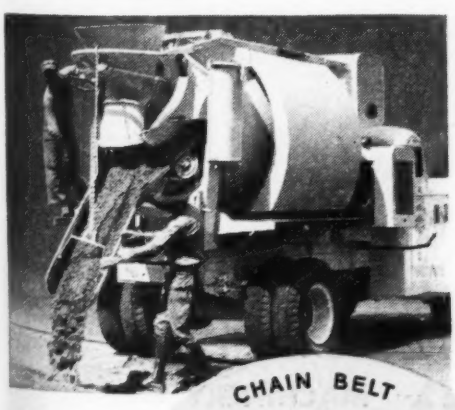


THE CHAIN TAKES THE STRAIN

The exclusive Rex chain drum drive eliminates stresses and strains. The chain protects transmission . . . gears . . . shafting . . . power plant. It eliminates binding between drum and transmission as the truck chassis weaves over uneven ground. The chain effectively dampens vibration, assuring far less driver fatigue.

Life-Saver Cost-Saver Time-Saver REX Hi-Discharge Moto-Mixer





Lower Maintenance and Operating Cost

The Rex drum drive is a weight-saver. It eliminates the need of bulky, excessively heavy transmission cases, shafting, bearings, etc. This saving in weight here permits Rex to build added strength into parts where it is really needed . . . blades, drum rollers, drum shell and drum support. Here's why Rex gives you lower maintenance costs and assures less operating time.

Time-Saving, Fast Discharge

You'll save minutes every batch with Rex Moto-Mixers. Since Rex mixes in the discharge direction, the batch is always right up at the opening . . . ready to come out in a hurry. Deep spiral scoops speed the batch out *fast!* Remember, it's at the job site where speed is important to avoid holding up your customer's schedules.

For all facts, see your Rex Distributor or write for Bulletin No. 468. Chain Belt Company of Milwaukee, 1649 W. Bruce St., Milwaukee 4, Wis.

CHAIN BELT REX COMPANY

CONSTRUCTION MACHINERY

Moto-Mixers • Moto-Agitators

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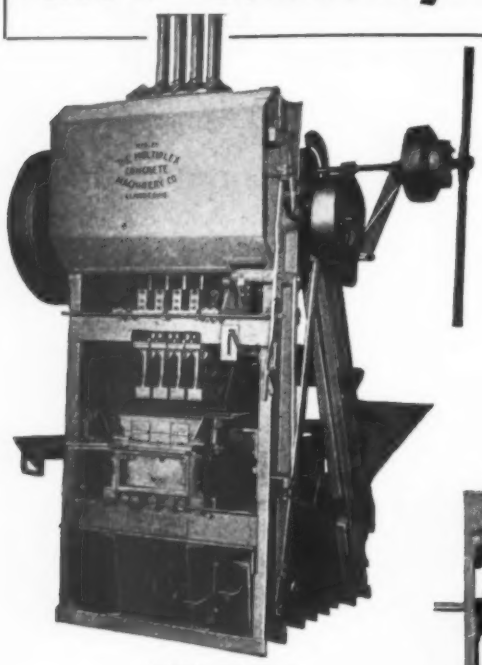
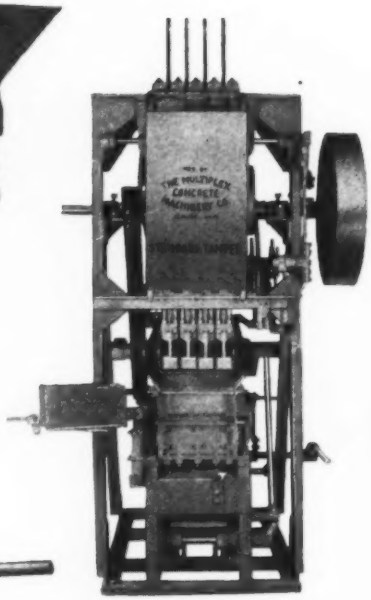
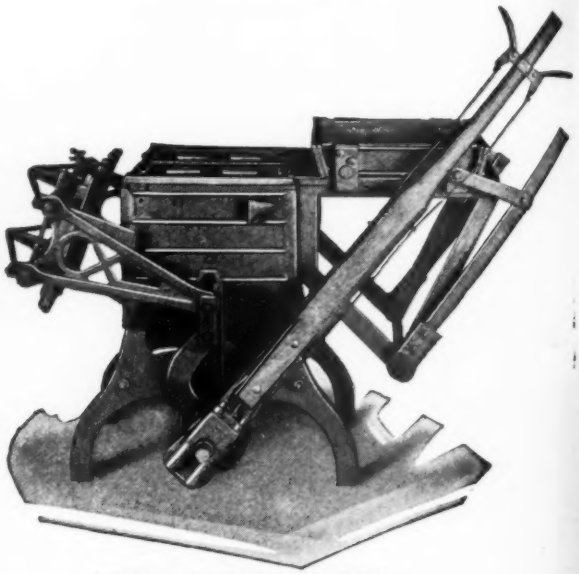
From our founding in 1906, as the nation's first producer of complete block-making equipment, we have never compromised with quality — not even in these days of overwhelming demand for Multiplex units. With our new plant in full production at Oak Harbor, Ohio, we are delivering many more machines than ever before, and we're delivering them *complete with traditional Multiplex quality.*



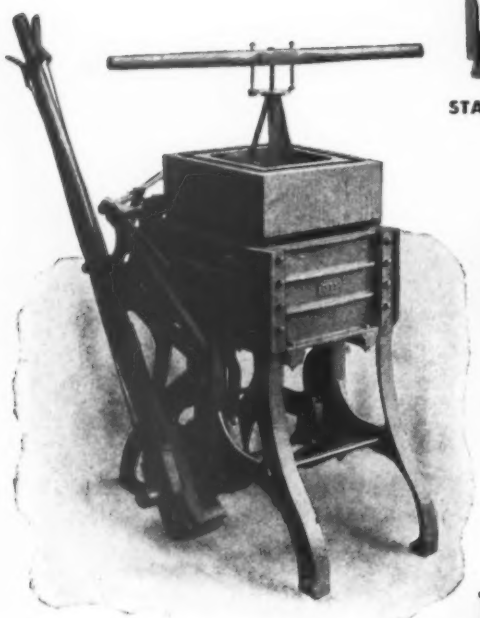
SUPER TAMPER



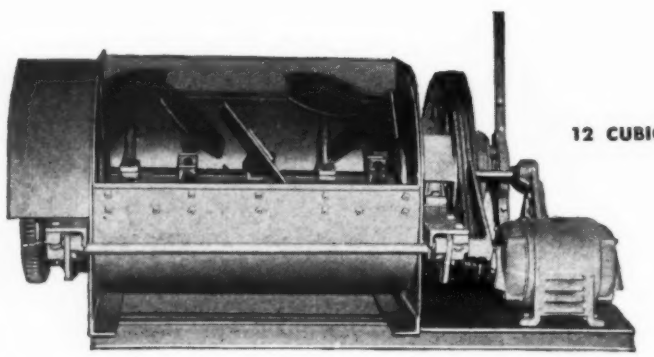
STANDARD STRAIGHT 8



MODEL C-1 DOUBLE STRIPPER



MODEL F FLUE BLOCK MACHINE



12 CUBIC FEET V-BELT DRIVE

MULTIPLEX CONCRETE MACHINERY CO.

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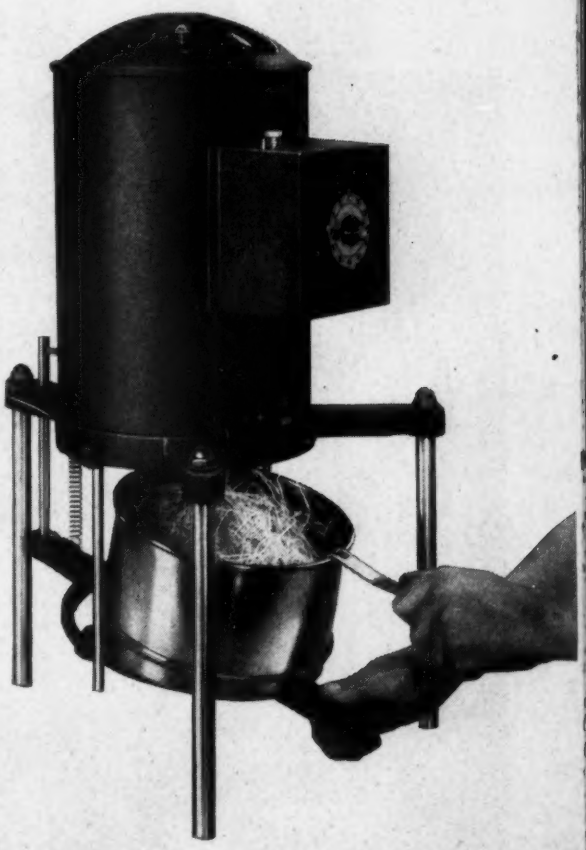
Model 275 is designed for materials not sensitive to drying temperatures. It has a drying pan 5" in diameter holding up to 100 gram samples.

Model 275T is used for all substances, the testing of which requires precise temperature control. It may be used as a flash drying oven for liquids or small samples.

Model 278T is used for bulky samples up to 500 grams. It is ideal for handling a large number of liquid samples and for drying materials in the wet screen analysis. The pans are 8" in diameter and may be from 1" to 4" in depth.



Write for descriptive folder and prices.

28

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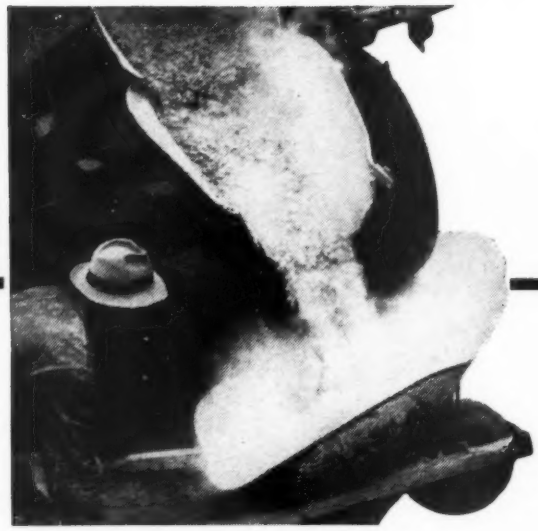
HERE'S WHY THEY ASK FOR 'INCOR'



'INCOR' CUTS
WINTER COSTS IN HALF

EACH year more and more Ready-Mix Plant customers ask for 'Incor' 24-Hour Cement for cold-weather concreting. That's because 'Incor', America's FIRST high early strength Portland cement, has made year-around concreting economically feasible. And savings with 'Incor' are greater today than ever before.

Consider what it means at today's costs to save two days' heating fuel and labor on each pour . . . cut form and tarpaulin costs in half . . . reduce overhead through earlier completion.

Another sound reason why leading Ready-Mix operators make 'Incor'* concrete available at all seasons, as part of their good service. *Reg. U. S. Pat. Off.

LONE STAR CEMENTS COVER EVERY CONSTRUCTION NEED

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Making Long Concrete Joists and Roof Slabs

Formigli Corporation installs machine to manufacture longest type Lithibar joists; also make Channelcrete roofing slabs at Berlin, N. J. plant

By W. B. LENHART

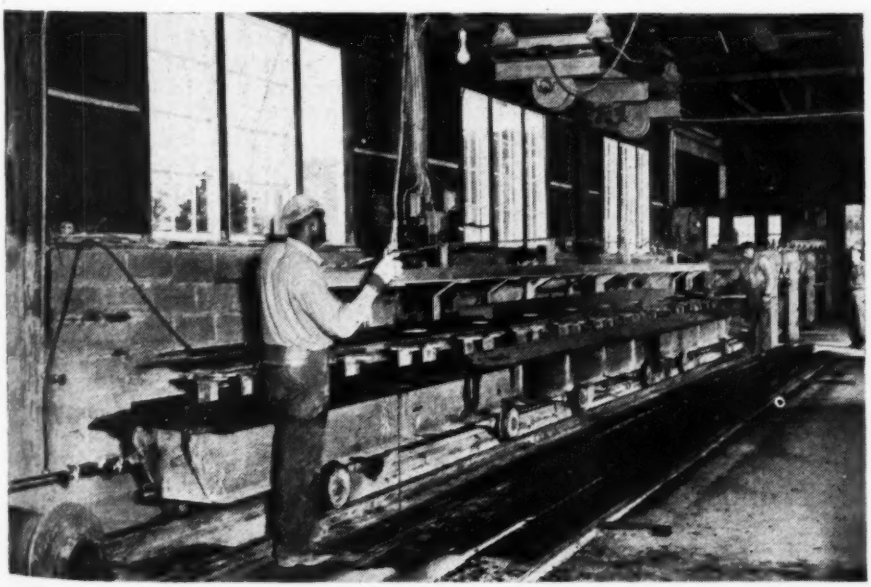
Two concrete products plants are operated by the Formigli Corporation, one in Berlin, N. J., and the second, a few miles away on the Williamstown Junction road, which is the older plant established in 1914 by the father of the brothers, comprising the present management group. The plant in Berlin proper is devoted to manufacture of concrete specialties, notably concrete piling. This operation is treated in a separate article. The plant at Williamstown Junction manufactures Channelcrete roofing slabs, and just recently installed a 40-ft. Lithibar machine for the production of rolled concrete joists capable of producing the longest joists of this type.

Pioneering in the manufacture of many new and novel precast concrete items, the Formigli brothers just recently formed an association with the Arnold Stone Co., Richmond, Va., to carry out research work related to concrete products. The research organization is named the F & A Engineering Laboratories, and takes its name from the first letters in the names of the two cooperative companies. While in Germany recently, Otto Formigli gathered considerable data and ideas that will be developed by this research organization along with several other plans previously formulated.

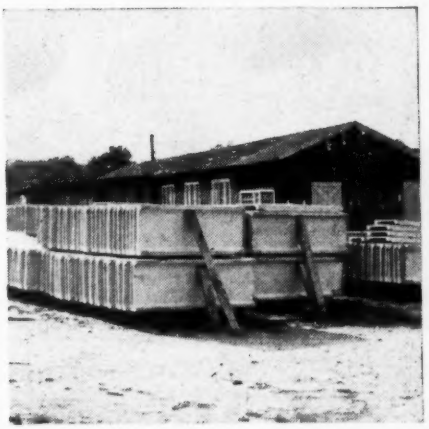
This new Lithibar installation provides a high production machine to fill the demand for concrete joists in the Philadelphia-Camden and adjacent areas. Working every day at top production, the machine turns out an average of one 40-ft. joist every three minutes.

Manufacturing Steps

Steel reinforcing for the concrete joists is made on a balanced, electric welding unit produced in the company shops. Aggregates are usually lightweight, and the concrete is designed to show compressive strengths of at least 4000 p.s.i. The joists, during the forming period are not vibrated but rolled under a series of heavy steel rollers that compress the concrete under about 2000 lbs. pressure.



Operator is lifting a "green" joist from the mold by means of the multi-hook lift fork. Bar on the pallet is not the longest being used

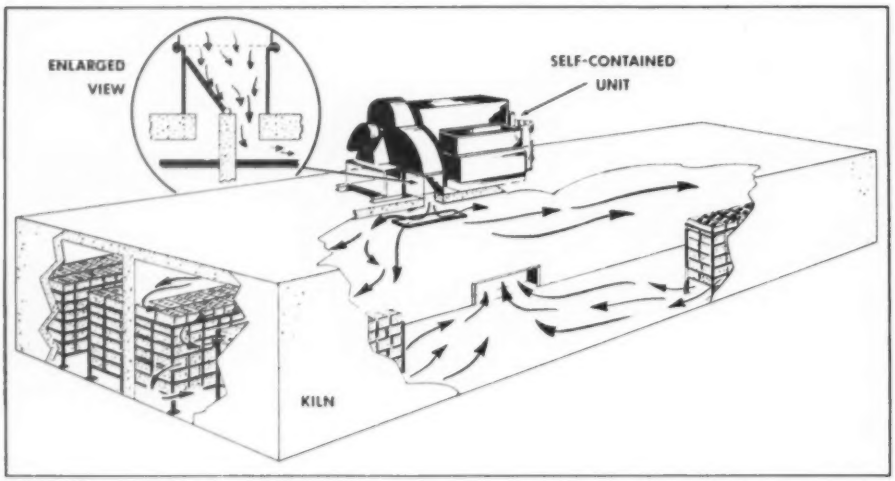


Part of the big storage area for Channelcrete roof slabs

At this plant the 40-ft. long steel pallet is first placed on the machine carriage after which about 2 in. of concrete is spread uniformly over the pallet. The steel reinforcing unit is then placed on the concrete and the travelling carriage again passed under the loading point. After the form is filled with concrete, it is pulled under the 10 forming rolls and the concrete gradually compressed and, at the same time, the shape of the side of the joist is formed. On a 40-ft. section all 10 of the rolls are used. The first one forms a slight "V"-shaped notch in the top of the fresh concrete. The second roll enlarges this notch slightly and so on through the 10 rolls until the final cast resembles the "I" beam. After passing through the last roll, the travelling carriage stops and 24 "lifting points," spaced equally along and under the steel pallet, raise up the "green" joist and an electric crane that spans the building picks up the unit and stacks it in a steel rack. When Haydite is used as aggregate no particular curing system is used. However, joists are steam cured under tarpaulins when other than Haydite aggregate is used.

The Lithibar machine is of rugged and heavy steel construction throughout, and produces a joist free from irregularities and of uniform appearance throughout. When the joists are to be exposed in the ceilings, special precautions can be taken to insure a highly smooth and clean finish with fine cut moulded junctions. Owing to lack of head room, the concrete is mixed in a Stearns mixer and skip-transported to the hopper over the assembly. The only power required for the machine is a 10-hp. hoist that pulls the travelling form under the loading hopper and forming rolls, and this unit uses a 2-hp. Sterling direct-power applicator motor. Some additional power is needed for the electric crane lifting the units and for the two Lincoln arc welders used in assembling the reinforcing units.

(Continued on page 182)



Showing moist heat-dry heat curing unit mounted over two kilns at Illinois Brick Plant No. 1

Illinois Brick Co., Franklin Park, Ill., plant installs new system employing a blower with provision for heating air-stream with or without moisture in a self-contained unit, eliminating considerable piping and ducts

Combine Wet and Dry-Air Curing System

LOCATED in Franklin Park, a Chicago suburb 15 miles due west of the city, Illinois Brick Co.'s Plant No. 1 is strategically situated from the standpoint of either rail or truck deliveries of lightweight aggregate and bulk cement. Raw materials are elevated from track hoppers to overhead bins by bucket elevators, with a gravity flow system from bins to mixers over two high-capacity block machines. When this plant, originally Chicago Insulcrete Co., was purchased by Illinois Brick Co. several years ago, Henry Buchholz, principal owner, was retained and placed in charge of the Concrete Products Division of the larger company. Mr. Buchholz, president of the National Concrete Masonry Association, has always tried to keep abreast of innovations in block manufacture, and in step with this effort a new and radically different system for block curing has been installed at Franklin Park.

To provide high-temperature steam curing for the 1200 block per hr. machine capacity, the new curing arrangement that has been installed on existing kilns is an interesting departure from the boiler, dry-air blower system in common use elsewhere. The system is essentially a blower with provision for heating the air-stream either with or without moisture (steam) added, and is a self-contained unit measuring only 4- x 7- x 11-ft.

For economical operation, one curing unit has been mounted over every two kilns, thus doing away with extensive duct work. Of eight kilns at Franklin Park, four are of 2100-block capacity each and four are of 1440-block capacity each, with two different capacity curing machines for the two kiln sizes. The larger machine delivers 4500 c.f.m. of steam or hot dry air and the smaller machine delivers 3500 c.f.m. All four machines at this plant are natural gas fired, with maximum gas demand for both units being approximately 700 c.f.h. and normal gas consumption 400 c.f.h. Both sizes use a 3-phase squirrel cage motor of 5 and 3 hp. respectively, connected to the blower by a V-belt drive.

In operation, the curing unit blower draws air through a gas-fired heater and over a series of baffles in a water spray box to produce steam-laden air which is introduced into the kiln. A trap in the duct immediately over the kiln captures any possible free water that may be in the air stream. An important phase in the economy of this machine is provided by the re-circulation of air in the moist-heat period. Instead of drawing in fresh air that must be heated and steam-impregnated, air is returned from the kiln and reheated. In the dry heat cycle, water sprays are turned off, fresh air is introduced through the heater and the moisture laden air-return from the kiln is vented to outside. An additional "re-circulation" factor in this unit is that excess water from the spray chamber as well as water collected in the duct trap is repumped through the spray nozzles in the steam generating chambers.

Installation costs of the four units are figured as approximately equal to an adequate boiler and piping system for a moist heat period only, without the added expense of dry-air blower and duct work. In addition, the four units at Franklin Park provide a "spare" in case of a breakdown of one unit. Curing cycle employed at this plant is that approved by the National Concrete Masonry Association. When 180 deg. F. is reached in the kiln, the live steam period is continued for one hour and then automatically cut off to allow for an 8-hr. soaking period. The final 3-hr. dry heat period is also automatic and utilizes the same machine and duct system.

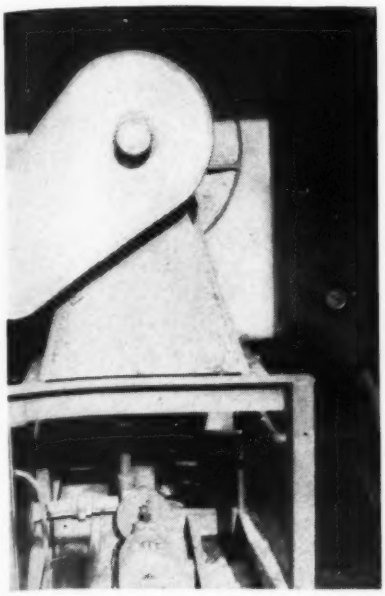
With the unit located directly over the dividing wall between the two kilns it serves, the duct system merely consists of two vertical ducts directly below the unit. One duct vents at the top of the kiln for steam or dry air entry and the second duct, for return air, has an opening near the floor. Two dampers are used to direct the flow to or from the kiln being operated at any one time. This machine is capable of exhausting steam from a kiln in five minutes. A 4500 c.f.m. unit is advocated for a kiln of approximately 5000-cu. ft. capacity. An added advantage of this system is the comparative absence of condensation water in the kiln, but the Illinois Brick Co. still provides drains for condensation that is a necessary counterpart for any moist-heat curing system. The unit produces a full volume of steam within five minutes of burner ignition.

The idea utilized in this new curing device is an adaptation of a metal heat-treating unit built by the same manufacturer, Campion-Detroit, Inc., Detroit, for the past twelve years. Cost per block for curing is less than ⅕-cent, according to the manufacturer.

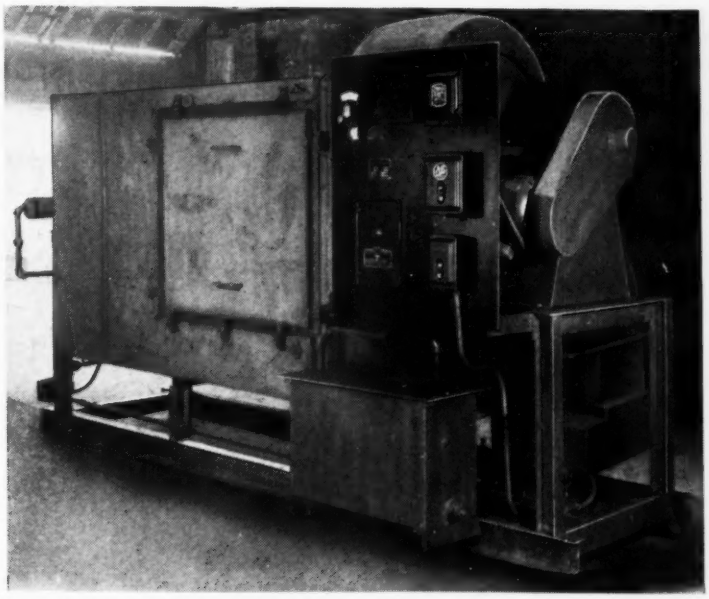
Existing kilns at Franklin Park, in which the new system was installed are constructed of lightweight 8- x 8- x 16-in. block and brick in a single wall. The roof is of soffit block construction with a 4-in. Waylite aggregate insulation covering. With two 600 block per hr. Besser Super Vibrapacs, all modular size block are manufactured; and in addition, soffit block and special sizes to fit with common brick in building construction are produced. Waylite aggregate is used for all units manufactured at this plant.

Al Neubeiser is superintendent of both the Franklin Park and Blue Island block plants of Illinois Brick Co.

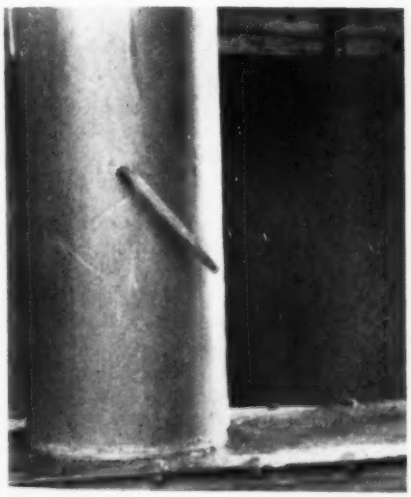
SNAP SHOTS of Curing System



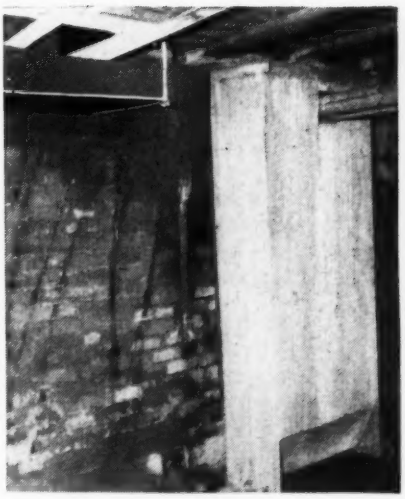
Close-up of moist air-dry heat curing unit.



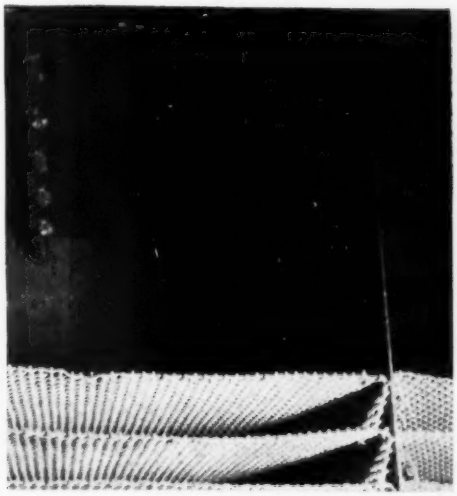
To the left may be seen one of two gas inlets; water-spray baffle box; control panel over water supply box. Steel plate, upper left, deflects current of either moist or dry air over entire kiln



Return duct from kiln, showing damper that diverts moist heat air back to unit or vent dry heat

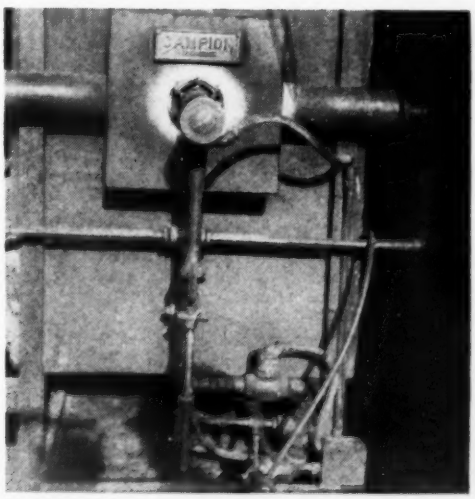


Steel plate, upper left, deflects current of either moist or dry air over entire kiln. Duct, right, is air return from kiln to unit directly above. Note closed damper at floor level



Water spray chambers. Water line with five nozzles, upper left; baffles formed by 12 galvanized wire trays per chamber. Heated air passes down through screens and under central dividing baffle and up through similar screens

Al Neubiser, left, superintendent; and Henry Buchholz, manager, to the right



Gas-fired air heater. Pipes, right and left, are main burners; center, pilot light

Design Plant For

ECONOMICAL OPERATION

Geo. W. Katterjohn built new block plant to meet future requirements. Promotes sale of concrete products by prominent use of Katter-Blox trade-mark

By DAVID MOCINE

High production block machine in action

PROFITING from experience in operating the parent block plant at Paducah, Ky., that like Topsy, "just growed," the new plant of Geo. W. Katterjohn in Owensboro was planned in every detail from aggregate storage to finished block or brick. Future expansion has been allowed for in the design so that it can be doubled without any major changes other than the addition of a second block machine and additional kilns.

The building housing the plant is of concrete block construction with a light, airy and spacious interior, but all space is utilized and the building was designed to fit the necessary machinery. Five kilns extend on one side of the plant, with doors at both ends for ease of access in charging or emptying. At the yard end, vertically sliding metal kiln doors are provided with posts carrying pulleys and counter weights, while at the end facing the machine floor, kilns are closed with hinged doors of reinforced plywood construction. Windows extending the entire second story on the plant proper assure adequate light in this section of the operation. A separate room, to house the boiler, stoker and controls, is located immediately adjacent to the plant office at one side of the building. The four-acre storage yard is provided with ample paved runways and cubing areas, while the area next to the plant is provided with a concrete apron and the balance of the yard is covered with a rolled cinder fill.

Materials Supplied from Stockpiles

From the standpoint of transportation, the new plant is ideally situated as it is located between two different rail lines paralleling the two long sides of the property, and with a concrete highway across the end. Lightweight aggregate is stockpiled directly from hopper bottomed cars by means of a portable, self-contained car-unloader, without need for below-track hoppers. The unloader comprises a 12-in. belt on 6 ft. centers, operating in a trough, which is placed under the hopper bottomed car, resting on the rails of the tracks. This belt transfers material to another stockpiling belt, 25 ft. centers. Capacity of this unloader averages 20 t.p.h.

Because cars can be spotted at any point on either of two tracks on both sides of the plant, aggregate can be conveniently stockpiled. Material is reclaimed from these stockpiles by a 12-cu. ft. gasoline-powered scoop truck that transports it to the below floor-level mixer of 50-cu. ft. capacity. Bagged air-entraining Portland cement is stored on pallets which may be brought up next to the mixer by a fork lift truck. Concrete is elevated to a hopper above the Besser Super Vibrapac block machine by a skip-hoist. A mirror, mounted over the hopper, allows the mixer operator on the floor level to determine the proper time for recharging the hopper with concrete. The block machine has a capacity of 625 block per hr. A hand lift truck is used to move empty racks from the rear of the block machine, after pallets have been removed, to the front of the machine, ready for green block.

Loaded racks are taken to or removed from the kilns by a gasoline powered platform truck. Block shapes or brick are cubed on wooden pallets in the paved storage yard, preparatory to being stacked three-high by a fork lift truck, also gasoline powered. Compressed air for the off-bearer is supplied by an air compressor usually registering 180 p.s.i., and powered by a 5-hp. electric motor. All electric controls are arranged on one wall of the shop, neatly lettered and labeled against an aluminum painted background. In the middle of the wall, in large black letters surrounded by fuse boxes, switches and distribution boxes, is the reminder: "Build With Katter-Blox."

Nowhere in the plant is a chance missed to remind the visitor of the

Paved storage yard facilitates the stacking of cubed block

product or how it should be used. Across the front of the block machine, on the sides of the lift trucks or delivery trucks, and even on the kiln doors, the words "Katter-Blox" and "Katter-Brik" serve as constant reminders. Perce Clement, office manager, Geo. W. Katterjohn Concrete Products, is a firm believer in easy to remember, catchy trade names—in an effort to have the public ask for the trade name rather than use the general term, concrete block.

Curing Facilities

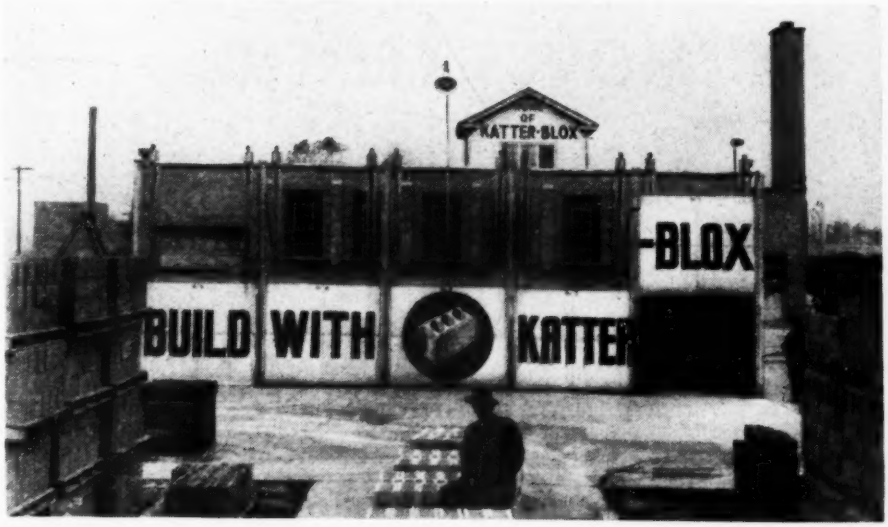
Five kilns of cinder block and reinforced concrete roof slab construction have a capacity of 1440 block each. When the backlog of orders permits, it is planned to install an insulation course over the roof slab. After the kilns are charged, the block is allowed to set for a 2-hr. period before live steam at 175 deg. F. is introduced by means of a pipe with holes spaced 18-in. apart. The pipe, supported from the ceiling, is installed the entire length of the kiln. When the kilns were first placed in operation, two pipes were used, one on each side down near the floor level; but it was found that they were too often torn out by rack trucks. Live steam continues to enter the kilns for an 8-hr. period, following which there is an 8-hr. period of soaking before the kilns are "cracked." Block are removed to the yard for cubing through insulated doors at the opposite end of the kilns.

A high pressure 50-hp. boiler, fired by a coal stoker supplies steam for the kilns as well as auxiliary uses such as plant and office heating. Complete automatic controls for the boiler include pressure control and stoker shut-off; automatic water feed, control and shut-off; plus a pre-heater for boiler water and an alarm bell that rings in the event a pin shears off in the 400 lb. per hr. capacity coal stoker.

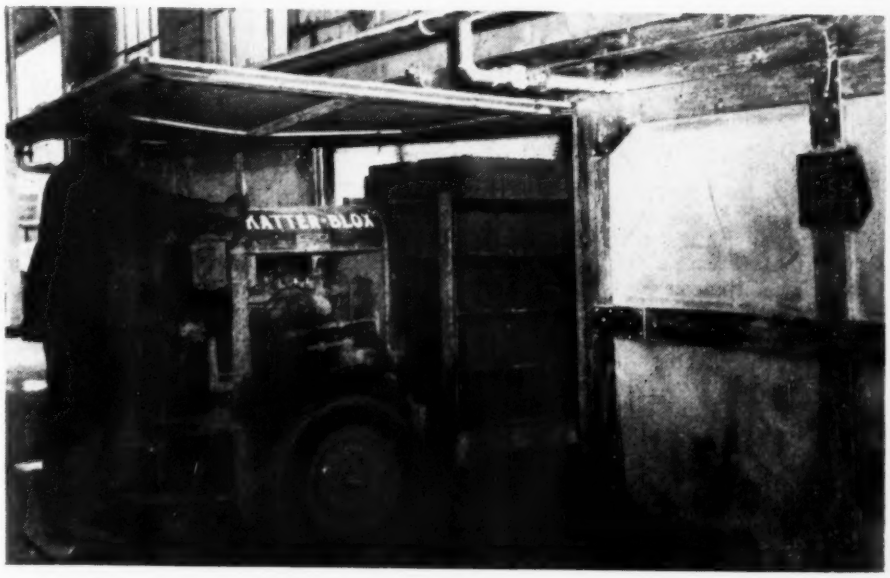
Making Limestone and Cinder Block

Two types of block and brick are made at this plant with production split almost evenly between cinder and limestone aggregate units. With cinder aggregate, a modular size 8-in. block weighs about 30 lb., but with limestone aggregate, the same block weighs about 43 lb. Cinders are brought in by rail from a public utilities company in a condition that requires no additional sizing. Limestone, known locally as Kentucky No, 11 or chat, is also delivered by rail. Results of 30-day tests conducted by the Division of Tests, Kentucky Department of Highways, show that heavy aggregate block from this plant withstand 1505 p.s.i. under compression, absorption is 10 lb. per cu. ft., and moisture content is 38 per cent. Cinder aggregate block test at 917 p.s.i.

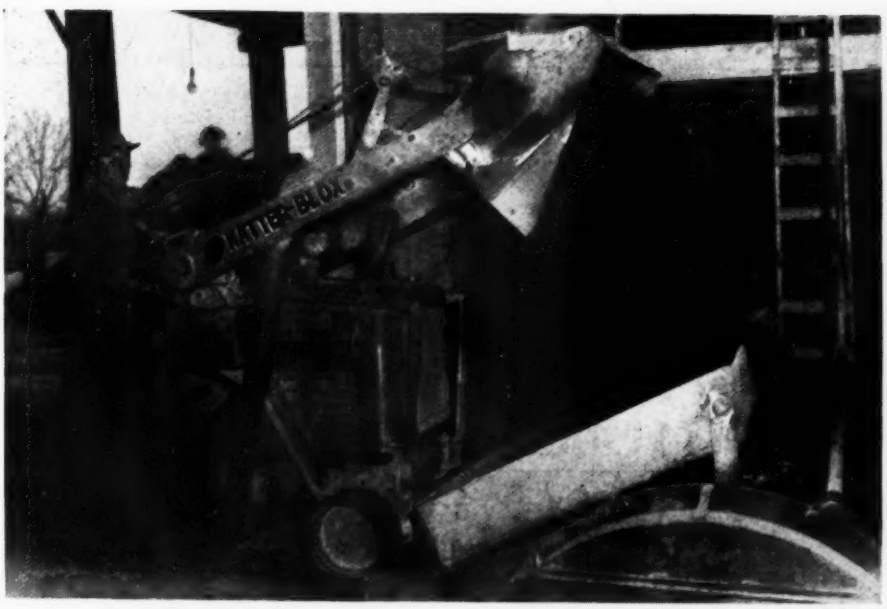
(Continued on page 183)



Exit side of curing room building. There are five kilns with some unusual advertising promotion. Geo. Katterjohn is sitting in the foreground



Lift truck moving block into one of the kilns

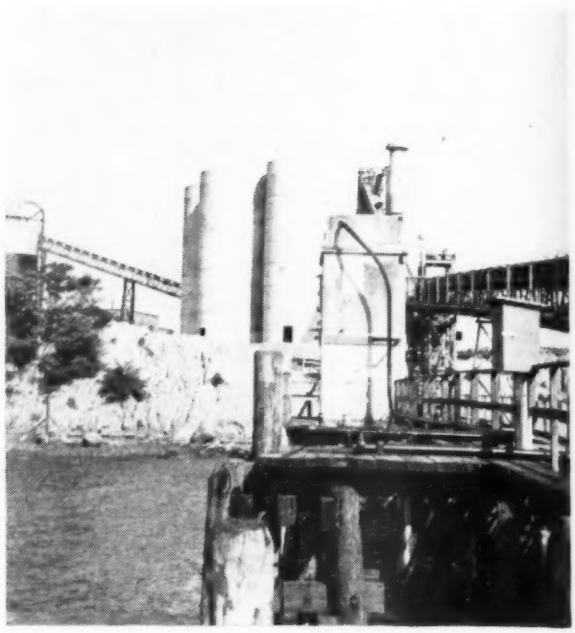


Scoop truck dumping aggregate over scalping screen into mixer

AIR MOVES CEMENT From Barges To Batching Bins

Metropolitan Sand and Gravel Co., Port Washington, Long Island, N. Y., transports cement from air-activated containers on barges through pipes to bins above batching plants in Brooklyn, the Bronx, and Flushing, N. Y.

By W. B. LENHART



Aggregate and cement storage silos behind transport pump house with pipe line from container-unloaders entering at the top, Flushing, N. Y., plant

IN METROPOLITAN NEW YORK CITY it is becoming a more or less common practice for aggregate producers to operate ready mixed concrete dry and wet batching plants, but the actual deliveries of the concrete, for the most part, are made by other companies owning the mixer truck equipment. Thus one such batching plant may serve many haulers.

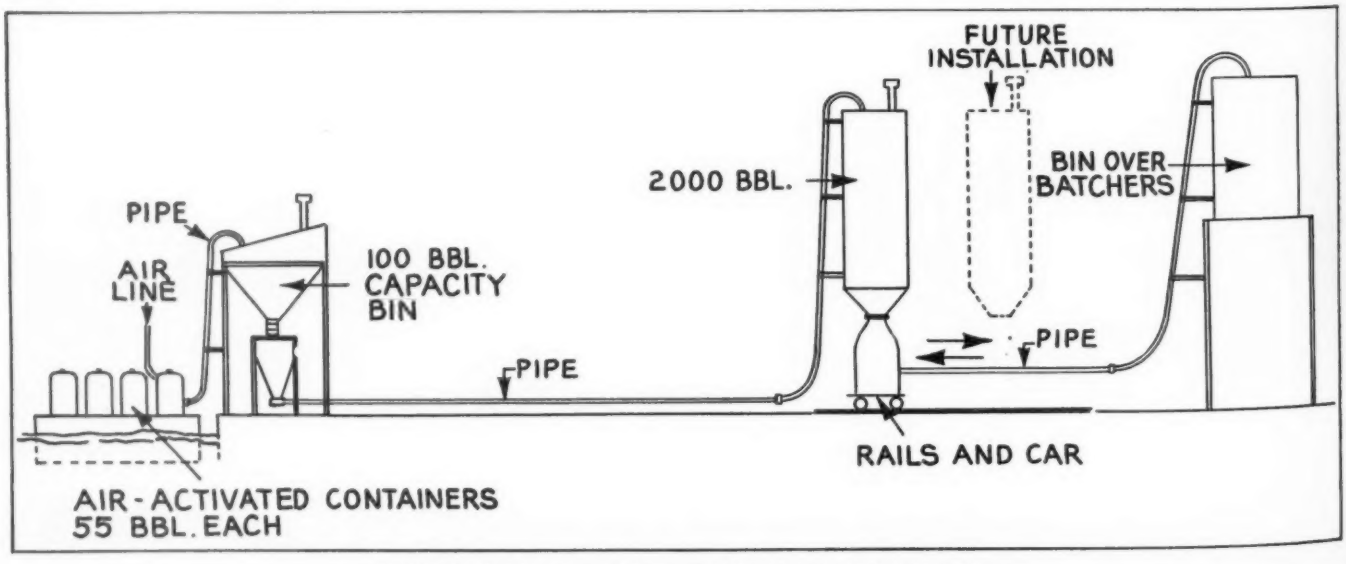
The Metropolitan Sand and Gravel Co., the main offices of which are in Port Washington, on Long Island, has a large sand and gravel operation there and one at Northport. This year, the company under the direction of H. F. Garvin Pelsue, president, is completing three large batching plants. These are all large capacity, all-steel and concrete construction, and modern throughout. The three plants are located in Brooklyn, the Bronx, and in Flushing, N. Y., and all receive aggregates and bulk cement by water borne transportation. At the same time, the new plants are located in or near the heart of a highly populated area in which a large volume of construction is taking place. In ROCK PRODUCTS, June, 1946, issue, an article was published about the general features of these three plants. We here deal only with the methods of handling the bulk cement at these new plants. Essentially the practice at one plant practically parallels the methods used in all three.

Located at Green Point at the foot of Commercial Street in Brooklyn is the first of the three plants to be completed. It was placed in operation during May of 1947. This plant, like all the others, is a fine example of good design coupled with excellent construction features.

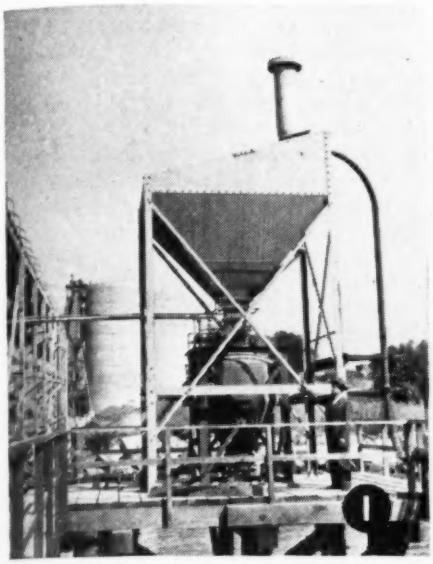
Barges Deliver Cement in Bulk Containers

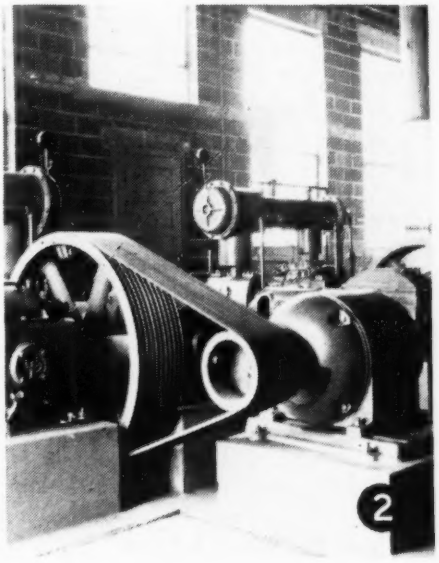
Bulk cement is delivered to the plant on barges that hold 22 of the L. C. L. Corporation's air-activated containers. Kennedy-Van Saun Manufacturing & Engineering Corporation is the builder and patent holder. Each steel container holds 55 bbl. of cement making 1210 bbl. for the barge load. A device is provided for each container to agitate the packed cement and deliver it by compressed air a short distance.

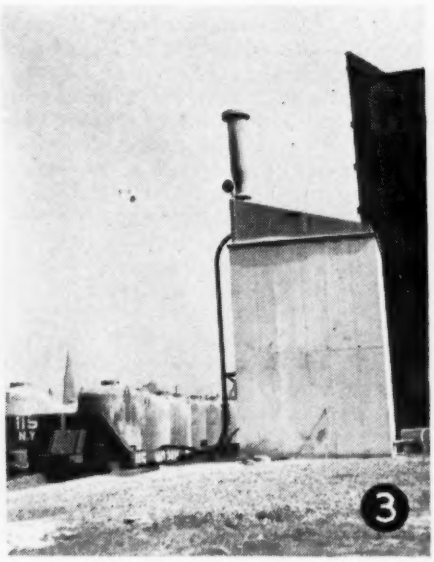
Containers are loaded at the cement plant by bulk loading facilities and on

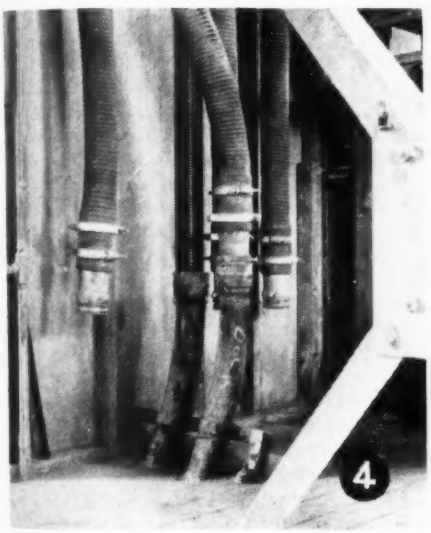


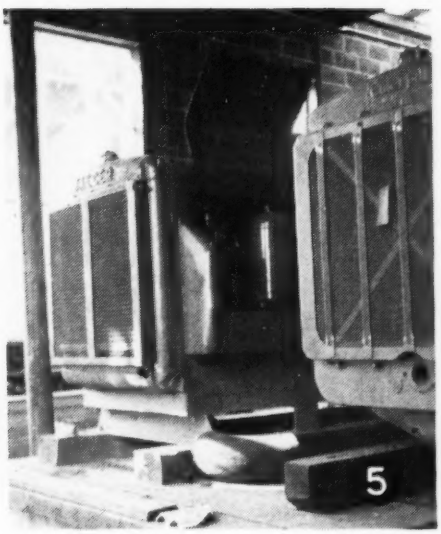
Sketch showing how cement is pumped from barges to batching bins











Views showing pneumatic system of handling bulk cement. Fig. 1: Miles B. Squire, engineer, standing alongside transport pump at Bronx ready mixed concrete batching plant. Fig. 2: Two 2-stage compressors supply air for Brooklyn plant. Fig. 3: Air-activated containers on barge deliver cement to 100-bbl. storage bin mounted over transport pump which moves cement through pipe to main storage silos. Fig. 4: Flexible pipe and couplings connect pump to any desired storage silo. Fig. 5: Two compressors supply air at Flushing plant. Fig. 6: Close-up of barge which holds 22 bulk cement containers, each having a capacity of 55 bbls. Fig. 7: Transport pump moves cement to cylindrical silos which serve the batch plant. Fig. 8: Showing cylindrical silos for bulk cement at Flushing plant. Fig. 9: One of the ready mixed concrete batching plants showing pipe lines through which cement is pumped to bins over batcher

arriving at the ready mixed concrete plant the individual container is connected to a source of compressed air and the cement extruded to the "Transporting Unit." When the air is turned on to the first container, the automatic valves and gauges function to automatically extrude the cement into the main "Transporting Unit." This latter unit consists of a 100-bbl. capacity steel bin mounted over the Kennedy-Van Saun pneumatic transport pump. The pneumatic transport pump is a cylindrical steel tank with a cone-shaped bottom, similar in general appearance to the containers that were previously mentioned, which at this plant are delivered by barges. However, this transporter has several interesting and distinguishing features. First, it is designed to deliver bulk cement greater distances and to higher elevation, and, secondly, it is entirely automatic as to filling and discharging.

Move Cement to Bins by Compressed Air

The transporter, operated by compressed air, is mounted on steel, coiled springs. It fills by gravity from the 100-bbl. bin above, and when full, automatically discharges itself by compressed air.

At the Green Point plant the cement is first transported from 50 to 150 ft. (depending on location of the barge, etc.), by compressed air applied to the 55 bbl. capacity containers on the barge. The transporter then pumps the cement to the main storage silo, a horizontal distance of about 350 ft., and a lift in the 50-ft. range. It takes from 15 to 20 minutes to unload one of the 55-bbl. units which includes the time for connecting the air line and the 4-in. discharge line. The second unit, or transporter, fills in about eight seconds and as the springs are forced downward by the weight of the cement, air pressure automatically closes the filling valve and opens the discharge valve so that the entire operation is automatic. This No. 5 unit will easily handle 200 bbl. per hour.

Cement is delivered by transporter to a 2000-bbl., two-compartment Johnson steel silo under which is mounted a Robinson air-activated conveyor system that functions somewhat along the same lines as the pressure tanks previously described. This pressure unit is so mounted and designed that it can be moved, via steel rails, and truck mountings to additional silos that may be built along side in the future. It delivers the cement to the four cement bins directly over the batchers. For connecting the transportation units to the four pipe lines serving the batching plant, easily connected Ever-Tite couplings are used.

At the Green Point plant, air for the operation of all the conveyor systems is supplied by two Chicago Pneumatic, two-stage compressors rated at 4000 c.f.m. Air is supplied at 100 lb. pressure.

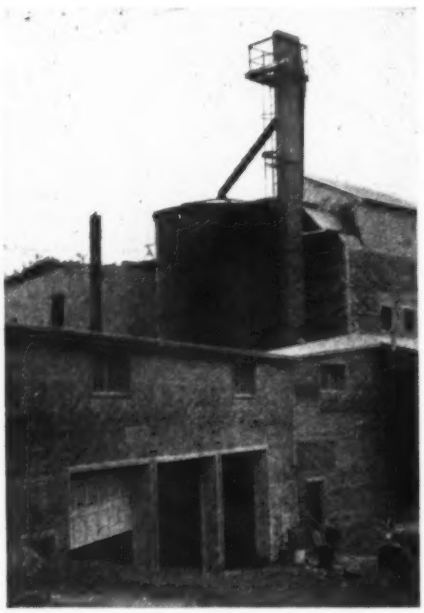
The second ready mixed concrete plant of the Metropolitan Sand and Gravel Co. is located at the foot of Tiffany street in the Bronx and the third on Flushing Bay at Flushing, N. Y., (120th street and 31st avenue). Delivery of the bulk cement from these two plants is essentially the same procedure as at Green Point. At Flushing, air is supplied by a 500 c.f.m. Jaeger and a 365 c.f.m. Gardner-Denver compressor driven by D15000 Caterpillar Diesels. These supply all the air needs of the plant. Four-inch lines are used for the transportation of the bulk cement. It is about 140 to 150 ft. from the barges (with a 20-ft. lift) to the transporter unit, and about 350 ft. horizontal and 60-ft. lift to the cement storage silo, however, the transporter can pump direct to the bins over the batchers if desired, in which case the horizontal distance is roughly 450 ft. with the lift being about the same.

The extended use of this type of transportation at all three of the new plants of the Metropolitan Sand and Gravel Co. indicate the practicability of the system. Some of the advantages of this type of air transportation are: no moving parts and hence less chance for excessive wear, practically foolproof performance, and an economical use of air (power).

Howard Marsh is general superintendent for the Metropolitan Sand and Gravel Co., and Richard Allen is in charge of the construction work.

READY MIX FOR MAINE TURNPIKE

IN 1941 the State of Maine set up the Maine Turnpike Authority to build a high speed highway across the state. The program in certain aspects followed that started years earlier by the Pennsylvania Turnpike Authority.



Most of the concrete for Maine Turnpike structures was supplied by ready mixed concrete plant of Cook & Co., Inc., Portland, Maine

The Maine Turnpike construction was delayed due to the war but work has been pressed with considerable vigor and early in 1948 the four-lane highway will be in use.

This job is unusual in that it is the largest bituminous concrete highway contract that has been let to date. All told there will be 640,000 tons of black top material that covers 1,360,000 sq. yds. of roadway involving a total expenditure of $20,000,000 for the full 45 miles of roadbed.

The Turnpike starts at Kittery, near the New Hampshire State line and extends to the outskirts of Portland, Me. The two lanes are each 24-ft. wide with an 18-ft. media strip and four 8-ft. prepared shoulders.

This large project includes a total of 43 bridges and overpasses, three intermediate entries as well as the two ends. This construction called for considerable massive concrete for the piers and other features.

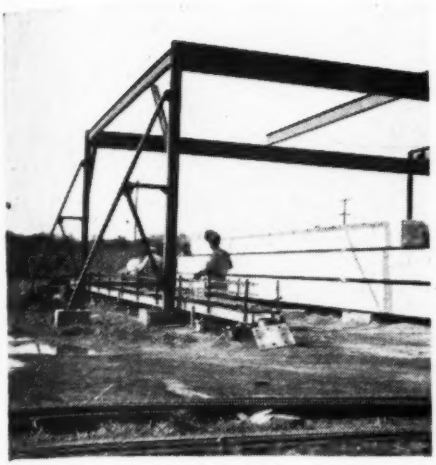
Most of this concrete was supplied by Cook & Co., Inc., of Portland, Me., which operates a quarry and crushing plant, and a ready mixed concrete plant. A second batching plant is operated on Bragdon Road, Scarboro, (South Portland) Me. Some 15,000 cu. yd. of ready mixed concrete was trucked up to 45 miles to the Turnpike in a fleet of Rex and Jaeger mixer trucks. The company has three 5-cu. yd., three 3½-cu. yd. and six 4-cu. yd. Rex truck mixers.

The plant was built many years ago by the Boston and Maine railroad. When the plant first started, aggregates were secured near the site of the plant, but now all aggregates are hauled in by rail. The plant is equipped for heating water and aggregate. Cement is shipped in bulk to the plant.

Specifications for concrete called for the following compressive strengths, and the Turnpike Authority stipulated this minimum quantity of cement as indicated in the tabulation.

Portland cement had to comply with

Size of Coarse Aggregates	Minimum Compressive Strengths 7 days	28 days	Minimum Bags Cement Per Cu. Yd.
No. 4 to 1-in	2500	3500	6½
No. 4 to 1-in.	2000	3000	6
No. 4 to 1½-in.	1500	2500	5½
No. 4 to 2-in.	1000	2000	5



Left: Welding heavy reinforcing used in the precast concrete piling. Center: Loading heavy piling on semi-trailer truck with the aid of overhead traveling hoist. Right: Office and part of plant at Berlin, N. J.

Tentative Specifications for Air-Entraining Portland Cement A.S.T.M. designations C 175, Type 1A or IIA. The amount of air entrained in the fresh mix was held at not less than 3 per cent and not over 6 per cent.

B. Perini and Sons, Inc., Framingham, Mass., had the primary paving contract with Gibbons and Reed of Salt Lake City, sub-contractors. The Lane Construction Co. and the Savin Construction Co. had the prime contracts for clearing and grubbing. Ellis C. Snodgrass, Inc., Portland, Me., and the Lane Construction Co. had the prime contracts for the bridges and overpasses.

A. C. Stanley is president of Cook & Co., Inc., and L. R. Small is superintendent of the ready mixed concrete operations.

Ready-Mix Plant Opened

Ed Porter and P. L. Dale recently announced the opening of their new ready mixed concrete plant in Garden City, Kan. Delivery of concrete will be by Dumpcrete trucks.

PRECAST CONCRETE PILING

During the recent war, the Formigli Corporation, Berlin, N. J., manufactured some 30,000 concrete bath tubs, many concrete practice bombs, and carried on other work of an unusual and pioneering nature. Among the new peace-time activities of the company is the manufacture of precast concrete piling and prefabricated concrete buildings.

Until recently most concrete piling, on account of its size and weight, was usually cast near the place of use. Seeing the great advantages of precast piling manufactured under close plant controls and supervision, this company about two years ago deviated from the set practice and established facilities at its Berlin, N. J., plant to make concrete piling. At the time of inspection an order was being filled for 136 piles, each 22-in. square and 67 ft. long. Each unit contains about three tons of reinforcing steel, and each pile weighs 18½ tons. The piling is for the Corson Inlet Bridge at Strathmore, N. J. Brann & Stewart Co. of Philadelphia is the contractor.

The piling plant is in the open alongside other facilities at Berlin, and the area devoted to its manufacture is spanned by a heavy steel framework to support the overhead traveling electric crane which handles the heavy items. Wood forms for casting the piling have ply-wood lining. Three of these piling are cast each day using six molds. Trap rock aggregate and Type 2 cement are used. Concrete is mixed in a small mixer and transported in rubber tired dollies to the forms. The concrete is electrically vibrated. Stripping is done every 48 hours. The pilings can be steam cured under tarpaulins if desired.

The piling reinforcement comprises 1⅛-in. and 1¼-in. square steel rod with ⅜-in. ties. Cages are electrically welded and assembled at this plant. Concrete is designed for a strength of 4200 lbs. at 7 days and 6500 lbs. at 28 days. After curing in the yard for 10 days the piling is hauled, one to a semi-trailer, to the place of use. It is said that piling can be transported economically by truck a distance of 200 miles. Four piling were delivered per day using two trucks on a 55-mile haul.

Piling are cast with a 2-in. diameter pipe in the center which extends to the pointed end. This pipe is for forcing high pressure water through the unit when jet driving. Water under 200-lb. pressure is forced through the 2-in. pipe, and the piling jetted for all but the last 2-ft. of its depth after which the unit is capped and driven 2-ft. into place.

The longest piling made to date were 70-ft. long. An order was recently completed for use in the Atlantic City Board Walk where 425 units were placed. These were 16-in. octagonal units, 35-ft. long. All the concrete piling were excellent in appearance with a smooth surface texture.

Left: Pouring concrete into piling forms. Right: Vibrating concrete in piling form

Reinforced Concrete Pressure Pipe

Manufactured On Two Levels

Prestressed reinforced pipe for Montreal, Canada, water system made by The Preload Co., of Canada, Ltd., and Atlas Construction Co., Ltd.

By M. W. LOVING

MUCH has been published in recent years about cement and concrete research and investigations of exposed concrete structures, initiated by engineering organizations, State and Federal departments and trade groups. Not infrequently, someone describes concrete structures—bridges, pavements and the like — in sound structural condition after 25 or more years of service as though that was unusual. Moreover, some prominent engineers as individuals, or as members of committees, indicate that the life expectancy is limited no matter how carefully they are designed and constructed. This applies mainly to the United States and not so much to foreign countries because concrete is more carefully made, and structures are more skillfully designed and constructed with it, by the engineers across the seas.

Cement and steel used to make reinforced concrete in foreign countries is no better than that used in this country, but are more expensive and funds for construction are limited. Thus, the engineers by force of necessity must design and install concrete structures with the utmost care, and economy. This is the primary reason why prestressed concrete-steel structures have been more wisely designed and constructed — using very high working stresses for both steel and concrete — especially in France and Germany. And for the same reasons, shortages and high cost of materials, prestressed concrete - steel structures will be more commonly used in this country; besides they have many advantages in strength and economy over the conventional designs.

Speaking again of research and investigations, there has been little if any apprehension from any responsible quarter, in this country or elsewhere, about the life expectancy of hydraulic structures built with concrete and reinforced concrete, especially reinforced concrete pressure pipe. The most important and expensive projects—aqueducts, sewage force mains, subaqueous intakes for water supplies and sewer outlets—are constructed with reinforced concrete pressure pipe. The life expectancy of this kind of pipe has been officially established at 100 years by the leading water works and consulting engineers all over the world. This estimate is based on the performance of natural cement mortar for lining and coating cast iron pipe since 1836 when its advantage for this purpose was first discovered by the French Academy of Science.

Fig. 2. Casting room where concrete is placed in the forms from two levels. Internal vibrators are used to place concrete of maximum strength and density

Proved by Experience

Washington, D. C., required 58,600 ft. of pressure pipe in diameters of 24 to 78 in. to operate under heads ranging from 32 to 340 ft. and alternate bids were taken in 1925 on reinforced concrete pressure pipe, and cast iron and steel pipe — lined with cement mortar. The bid for the reinforced concrete pressure pipe was low and it was used for the improvement. In awarding the contract, the Corps of Engineers had before them a very important and interesting report by Major P. C. Bullard, Corps of Engineers who was the Military Attaché to the United States Embassy in Paris, France; the following is quoted, in part, from that report:

"In 1894 the first installation of steel cylinder reinforced concrete pipe was made in Paris under direction of M. Bonna, who was a Director in the Department of Public Works. The experiment was successful and M. Bonna organized a company which does the largest business of its kind in Europe, and had up until 1925 installed some 1600 kilometers (944 miles) of reinforced concrete pipe. The history of these pipes is very satisfactory; there is on record but one case of sudden rupture, when two sections of pipe were blown out by water hammer, probably in the presence of entrained air during the tests of a new installation involving centrifugal pumps.

"Interviewed M. Mayearts Engineering Compagnie, Intercommunale Bruxelloise, largest water company in Belgium. This company has 53 installations of steel concrete pipe made during 1902-22, operating under heads up to 120 meters. No breaks are reported and no leaks. Upkeep is reported high on cast iron, with substantially none on concrete pipe. In 1925 a pipe which had been laid in 1900 was cut open for inspection and the steel found in excellent condition.

"Inspection of pipe in Paris. Inspected several sections of Bonna pipe that had been laid in 1899-1900 and removed in 1923 for investigation. Pipe smooth on inside, no apparent wear or pitting; steel reinforcement and plate found perfectly blue and in excellent condition."

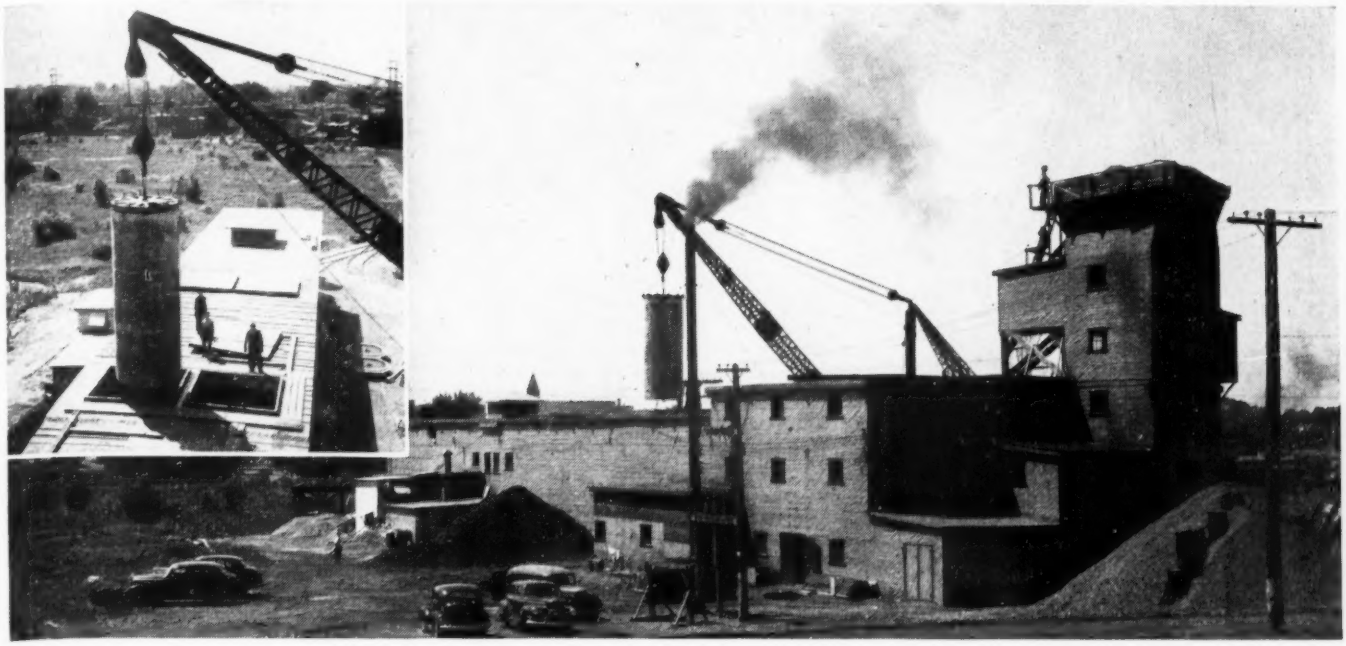


Fig. 1. Prestressed reinforced concrete pipe plant at Montreal, Canada. One crane is used to lift cement, fine and coarse aggregate to the storage bins, remove the cores from the curing room and yard the pipe

Since 1929 this Bonna pipe has been used as standard practice by the Montreal, Canada Water Board and more than 30 miles have been installed for replacing cast iron pipe in the existing system, and for new work, in the diameters ranging from 24 to 78 in. When the author interviewed Charles J. Des Baillets, chief engineer, Montreal Water Board in Montreal on July 4, 1947 he said the performance of this reinforced concrete pipe has been excellent.

The Colorado River Aqueduct was designed, and its construction supervised, by the Metropolitan Water District of Southern California. In *Engineering News-Record*, November 24, 1938, this great project is described by the engineers who did the work and an editorial depicts it as "an undertaking without peer in the history of construction—for conception, for plan and for execution."

Fig. 3. Workmen placing concrete in the mold from the top level and vibrating it with internal vibrators. There is no circumferential steel in the 5 in. shell, only the 12 twin sets of vertical steel rods

From the intake at Parker Dam, on the Colorado river 155 miles below Hoover Dam, the main aqueduct is 242 miles long, to the outlet at Cajalco Reservoir (re-named Lake Mathews). Except for the large steel pipe used at the five pump lifts, concrete and reinforced concrete was used for constructing the lined canals (63 miles), tunnels (92 miles) cut and cover conduits (55 miles), inverted syphons (29 miles) and the remaining three miles was open waterways in reservoirs and one mile of steel pipe lines at the 5 pump stations.

In the distributing system, from Lake Mathews to the 13 member cities in southern California comprising the District, the water flows by gravity through pipe lines of very large diameter, including 35.7 miles of reinforced concrete pressure pipe ranging in diameter from 9 ft., 8 in. to 12 ft., 8 in. These pipe were manufactured, by two firms and one contractor in very large plants, in 12 ft. lengths and the largest weighed 43 tons. They were transported to the site with large trailer-trucks and installed with cranes of standard and special design. The reinforced concrete pipe lines operate under heads from 25 to 290 ft.; those operating under the higher heads were provided with a steel cylinder of light gage, like the Bonna pipe, and lead-calked expansion joints were specified as a requisite of design. Because these joint assemblies were patented, they were first sold to the Metropolitan Water District of Southern California —for legal reasons—at $25 each.

The Colorado River Aqueduct cost about $200,000,000 while its companion project, Hoover Dam built in Boulder Canyon, cost about $140,000,000. About 38 per cent of the power developed at Hoover Dam is required to raise the water from an elevation of 450 ft. at Parker Dam, at five pump lifts, to an elevation of 1807 at Hayfield Reservoir—1357 ft.—with an additional head of 260 ft. to overcome friction loss. From Hayfield Reservoir the water flows by gravity, at 1500 cu. ft. per second, to Lake Mathews.

At Boston, Mass., a contract was awarded in 1938, by the Metropolitan District Water Supply Commission, for the manufacture and delivery of

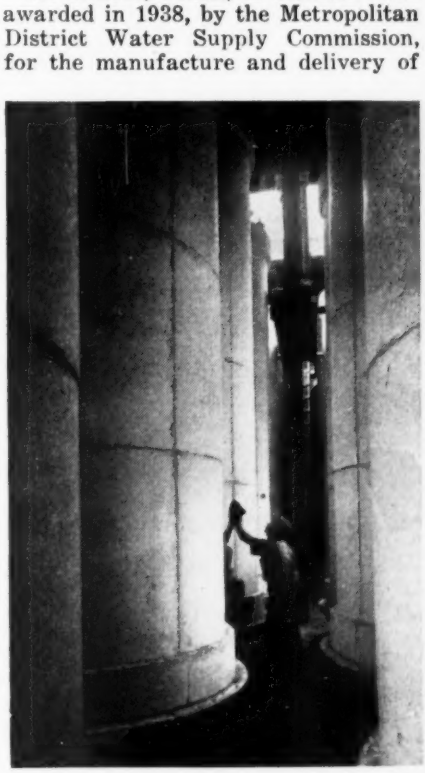


Fig. 4. Pipe in the curing room, still on the carbase rings, are steam cured for 72 hours. Form marks are shown on the pipe

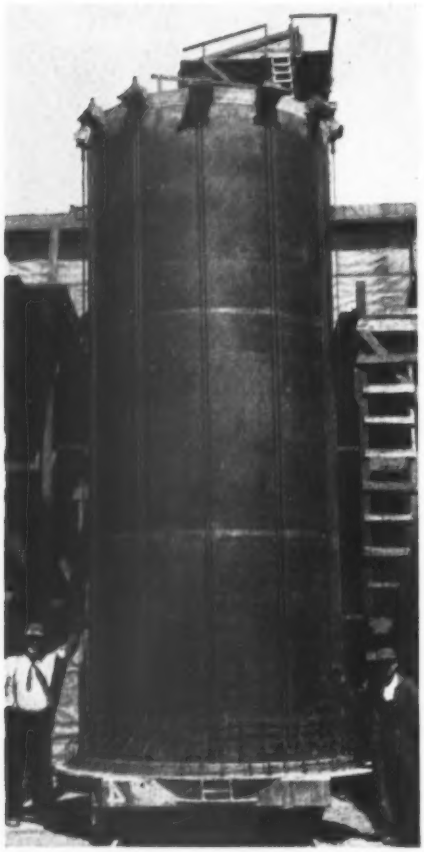


Fig. 5. This is the core, with the 12 twin sets of steel rods prestressed to 70,000 p.s.i.

steel cylinder reinforced concrete pipe at $4,250,000. The 12 ft., 6 in. diameter pipe, made in 12 ft. lengths, weighed 45 tons and 10,000 ft. were required. The 11 ft., 6 in. diameter pipe made in 16 ft. lengths weighed from 45 to 50 tons and 67,500 ft. were required. And 2200 ft. of 7 ft. diameter pipe were made in 12 ft. lengths; these weighed only 15 tons.

In a Special Report of the Metropolitan District Water Supply Commission and the Department of Public Health (House No. 262 of December 1, 1937) the late Frank E. Winsor, chief engineer said: "Progress in the art of construction of large pressure conduits of steel and concrete has been rapid in recent years, and the economies of the situation justify the use, in portions of the line, of large surface aqueducts similar to those recently constructed in portions of the Colorado River Aqueduct for the supply of the Metropolitan Water District of Southern California."

Fig. 6. Another view of core, showing vertical steel column and lever arms for shrinking the diameter 1.5 in. so it can be removed from the pipe. Steel column also centers the core on the winding table, Fig. 8

These cases are mentioned in this article, as typical examples, to emphasize the fact that engineers in charge of great and costly projects base their judgment and recommendations on precedent. Any material or combination of materials must be proven in actual service before they are considered or specified. The early, and very successful experience with steel cylinder reinforced concrete pressure pipe in France and Belgium, mentioned in the Washington case, had a profound influence at Washington, Montreal, Los Angeles, Boston, San Diego and the many other cases not mentioned here. Had the steel cylinder concrete pressure pipe not been designed and manufactured properly by Bonna in Paris, from 1894 to 1900, it would have failed and its use abandoned.

The San Diego Aqueduct, the most recent large project, was designed by the Bureau of Reclamation and its construction is being supervised by the Navy. It extends from the Colorado River Aqueduct, at San Jacinto to San Vicente Reservoir, near San Diego, Calif.

Reinforced concrete pressure pipe, 48, 54 and 72 in. in diameter were made in 16 ft. lengths and the 96 in. diameter was made in 12 ft. lengths. Sixty-four miles of these sizes were required and only 1.8 miles of steel pipe was required for the very high heads. The rest of the 71.1 miles of the aqueduct were constructed in tunnel with monolithic concrete, also used for stream crossings.

One of the manufacturers who produced 40 miles of this pipe said he spent $400,000 before he made one pipe; his corporation manufactured and installed a large per cent of the large pipe for the Colorado River Aqueduct in 1935-36. Among other things, 400 trucks of special design were required to haul—2 pipe each—from the plant near Los Angeles to the site.

Specifications required the reinforced concrete pressure pipe to be moist steam cured for 72 hours; or moist steam cured for 36 hours and the inside and outside surfaces of the pipe kept constantly wet with water spray for 7 days. There were no exceptions to this important requirement and large curing boxes were employed. This is one of the fundamental reasons why concrete pressure pipe has been so widely used by the leading engineers for important and expensive projects.

Those interested in reading more of the details of the design and construction of the San Diego Aqueduct will find an interesting article in *Civil Engineering* for July, 1947. In *Civil Engineering* for October, 1945 it was said that a separate contract was awarded by the Navy for the rubber joint assemblies for the sum of $563,282.50. These patented joints were specified as a requisite of design.

Importance of Expansion Joints

The joints of reinforced concrete pipe, used for water supply and when the water conveyed varies widely in temperature — Winter to Summer, must provide for expansion and contraction of the pipe line. This is the primary reason why pressure pipe is made in long lengths—to minimize the number of joints required in a pipe line. Joints must be made and remain tight when and if the pipe line is subject to movement, within practical limits, due to settlement or movement of the soil mass through which it is constructed. Water lines are constructed below the frost line and the external surfaces are not subjected to wide temperature variations. No reinforced concrete pressure pipe line should be exposed; they should always be covered with soil for 2 or more feet. These basic facts are founded on practical experience, the best and most reliable guide — here are some examples:

A gravity pipe line 27 miles long, was constructed in 1914 with 42 in. diameter reinforced concrete pressure pipe made in 4 ft. lengths. Because the

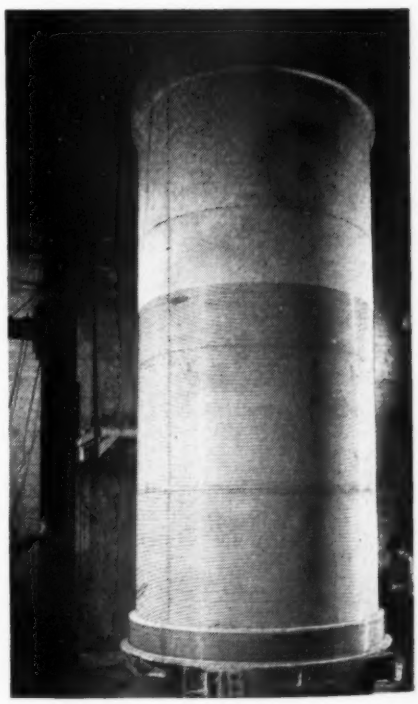


Fig. 7. Pipe being wound with 8-gage, oil-tempered, spring steel wire under a stress of 150,000 p.s.i. The pitch is 0.63 on the barrel and 0.31 at the ends; the machine is automatic and very accurate

line was constructed through mountainous country, with several inverted syphons operating under moderate heads, the engineer said it was not necessary to use expansion joints, which the manufacturer recommended and was able to supply. Moreover, the line, including the syphons, was exposed for most of its length. By 1925 the leakage in this pipe line was about 25 per cent in the Summer months and 89 per cent in the Winter months.

In 1914 a reinforced concrete pipe line, requiring 7900 ft. of 84 and 108 in. diameter reinforced concrete pressure pipe, made in 4 ft. lengths was constructed in a brick tunnel, 12 ft. in diameter. The engineer, very prominent today, said expansion joints were not necessary or the added cost justified because the temperature in the tunnel was almost constant—Winter and Summer. Again the manufacturer recommended expansion joints because the water flowing through the pipe line had a wide temperature variation from Winter to Summer. Anyway, the line was constructed with a few but not enough expansion joints. Designed for an operating head of 80 ft., the line functioned as a gravity line during low flows. Leakage under pressure and infiltration of "red water" during low flows caused much criticism of the manufacturer and reinforced concrete pressure pipe.

After these experiences the manufacturers took a definite stand: (1) They would quit the business unless; (2) every pipe was made in long lengths and be provided with an expansion joint; (3) all the pipe lines would be constructed and the joints made by the company; and (4) all lines would be tested under the operating heads for which they were designed and specified leakage guaranteed—this to be done before the pipe lines were back-filled.

This action, more than anything else, is responsible for the wide and extensive use of reinforced concrete pressure pipe for water supply in this country today. No one can violate sound engineering design and construction principles and stay in business long. Many have tried it and soon fell by the wayside; one water engineer told me his city has to provide $10,000 each year to patch leaks in a 72 in. diameter water line, built with reinforced concrete pipe without expansion joints.

Prestressed reinforced concrete pressure pipe has been described in ROCK PRODUCTS by the author in 1944—the work of Freyssinet in Paris, France, in the September issue and J. E. Miller of Chicago, Ill., in the October number.

Montreal's Prestressed Pipe

The largest prestressed reinforced concrete pipe of record are being manufactured at Montreal, Canada, for the Montreal Water Board. About 528 pipe, each 84 in. in diameter and 18 ft. long, will be required to construct a subaqueous water intake in the St. Lawrence river. Constructed with 4 lines of pipe, each 2200 ft. in length, the intake will have a water cover of 20 ft. and the velocity of the river water at the site is about 6 ft. per second. To protect the pipe lines against the devastating action of ice floes, they will be encased in concrete.

The pipe are designed to withstand, without leakage, an internal hydrostatic pressure of 50 p.s.i. and one in every twenty pipe are selected at random for this test. All of the pipe so tested have met this requirement with a liberal margin; one was tested to 100 p.s.i., without leakage. The shell thickness of the pipe is only 5 in. before and after prestressing, then a cover-coat of gunite about 0.75 in. in thickness is applied. The pipe weigh 15 tons before and 16 tons after the cover-coat is applied.

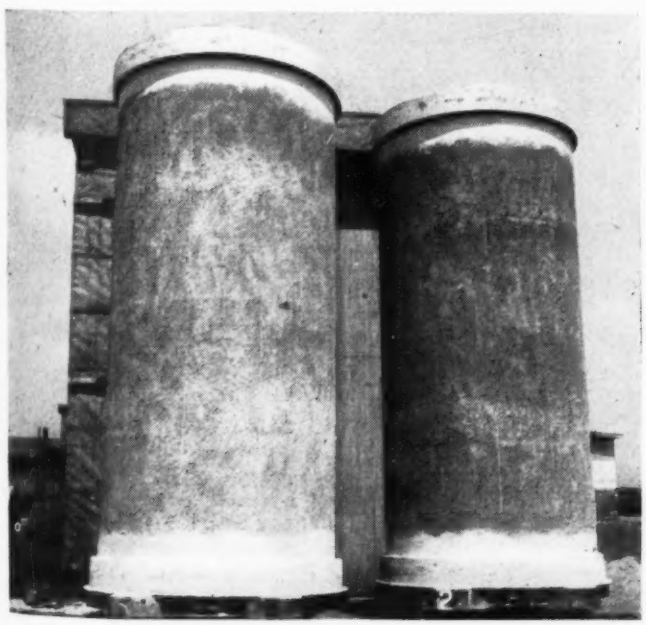
The Preload Co. of Canada, Ltd., and the Atlas Construction Co., Ltd., both of Montreal are manufacturing the pipe as a joint venture. Because the contract for the installation of the pipe lines has not been awarded, only the manufacturing and testing aspects are discussed here.

Manufacture Methods

Tenders (bids) were taken by the Montreal Water Board and the specifications provided for alternate designs—the conventional or Bonna pipe and the prestressed kind. The tenders for the Bonna pipe were 50 per cent higher than the accepted one for the prestressed reinforced concrete pipe.

The plant for making the pipe was completed in May, 1946, Fig. 1, and the first pipe was made in December, 1946. Difficulty in obtaining the required materials and equipment delayed operations until April, 1947, when the scheduled production of three pipe per day got under way. The plant was designed for cold weather operations. Thus the production is limited.

Views of the casting room are shown in Figs. 2 and 3 where three pipe are cast each day from two levels. The core, with the longitudinal rods in place and the lower half of the outer form in position, can be seen at the lower left in Fig. 2. The cores are made in one piece, as shown in Fig. 5 but the outer form was made in 4 three-part sections as the engineers required the pipe shell to be cast in



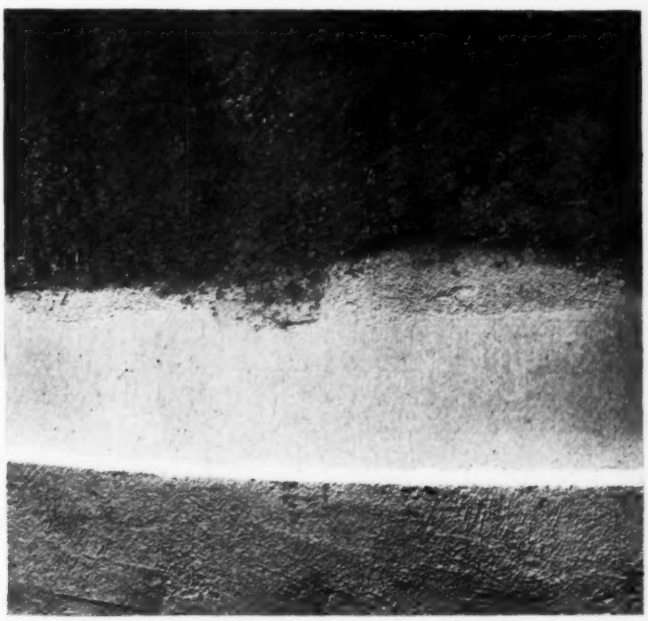


Fig. 9. Left: Two 84 in. diameter and 18 ft. long pipe, still on the car-base rings and a close-up view of the gunite finish on the barrel, purposely left rough for bond with the concrete encasement when laid and the smooth area to provide accurate placement of the coupling rings

Fig. 10. Workmen removing core from pipe in the curing room. Crane hook to the vertical shaft, when the core is lifted, shrinks it 1.5 in. See Fig. 6

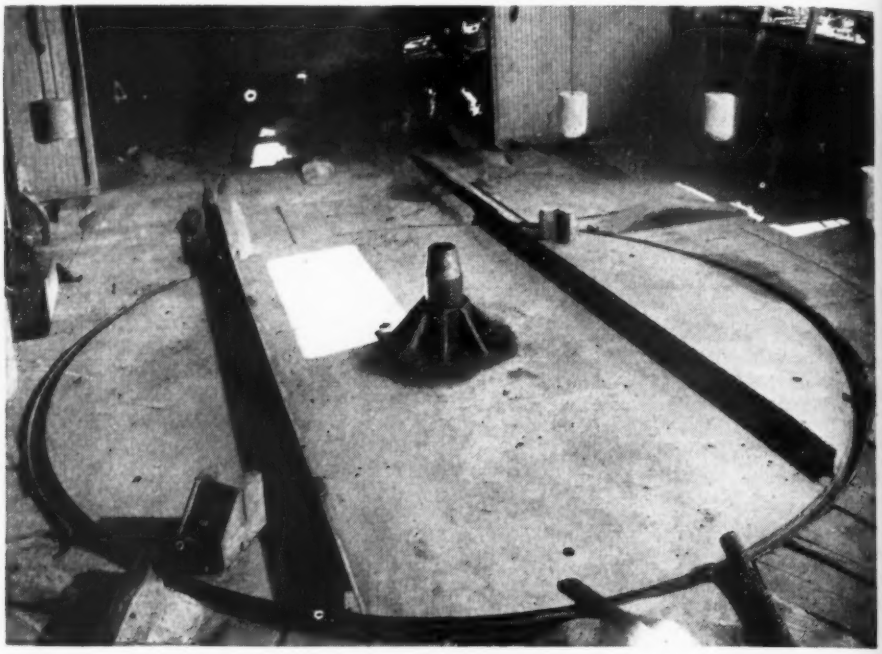


Fig. 8. The turn-table is power driven to revolve the pipe for winding

not less than two sections. Because no circumferential steel is in the shell of the pipe, internal vibrators were used to make the concrete of great strength and density. The workmen can be seen in Fig. 3, placing and vibrating the concrete from the top level of the casting room.

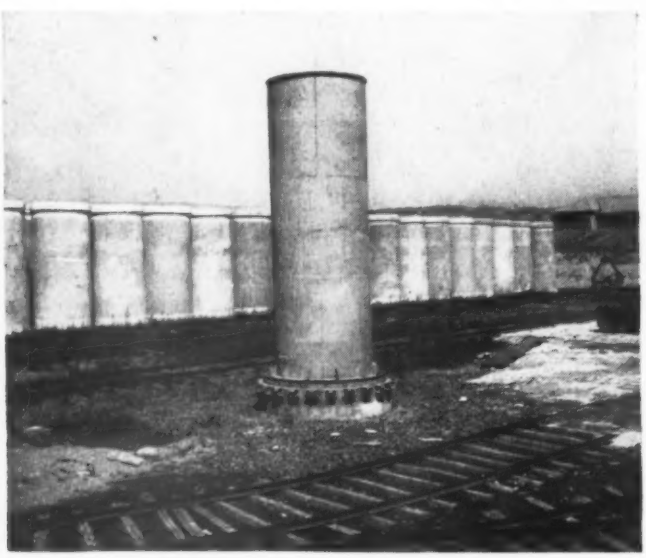
The second day the outer forms are removed and the three pipe are placed in a 12-pipe capacity curing room, Fig. 4. As will be seen, the pipe are cast and transported on cars which also function as base rings—27 are required. After the pipe are cured for 72 hours, at a temperature of 90 to 100 deg. F. and a relative humidity of 100 per cent, the core is removed through a hatch in the roof of the curing room, as shown in Fig. 1, inset.

The core is shown in Figs. 5 and 6, and in Fig. 10 the workmen are releasing the preload units, used to prestress the 12 twin sets of longitudinal rods. These rods are 0.44 in. in diameter and are stressed to 70,000 p.s.i.; the rigid design of the core was required to sustain the thrust of 264,000 lbs. The diameter of the core is reduced 1.5 in. by lifting the vertical column, which actuates the lever arms shown in Fig. 6.

From the curing room the pipe are transported, still on the car-base rings, to the winding machine, shown in Fig. 7 and the turn-table on which the pipe are placed and wound vertically, is shown in Fig. 8. Eight gage, oil tempered spring steel, wire is wound on the pipe under a stress of 150,000 p.s.i. and on a pitch of 0.63 in.; at the ends the pitch is 0.31 in. Because the pipe weighs 15 tons it is not necessary to secure it at the top to resist the 2500 lb. pull when the wire is wound on it. The residual stress of the wire, to sustain a working pressure of 50 p.s.i., is 114,000 p.s.i.; the difference between this and the 150,000 p.s.i. at which the wire is wound allows for volume change and plastic flow of the concrete shell.

From the winding room the pipe are placed in the gunite room where skilled workmen place a cover-coat about 0.75 in. in thickness; this is exceptionally well done. The pipe are cured by steam again for 20 hours. The texture of the cover-coat is purposely left rough to facilitate the bond of the concrete encasement, when the pipe are laid, and the finished texture of the two ends shown in Fig. 9 will provide for accurate placement of the

(Continued on page 171)



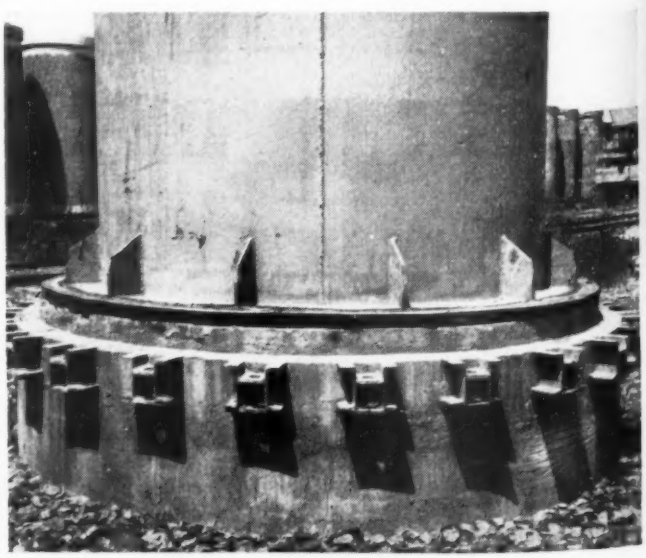


Fig. 12. Views of hydraulic tester for 84 in. diameter prestressed reinforced concrete pipe made in 18 ft. lengths for the Montreal Water Board. One in every 20 pipe are picked at random from stock, by the engineers for testing, without leakage of 50 p.s.i.

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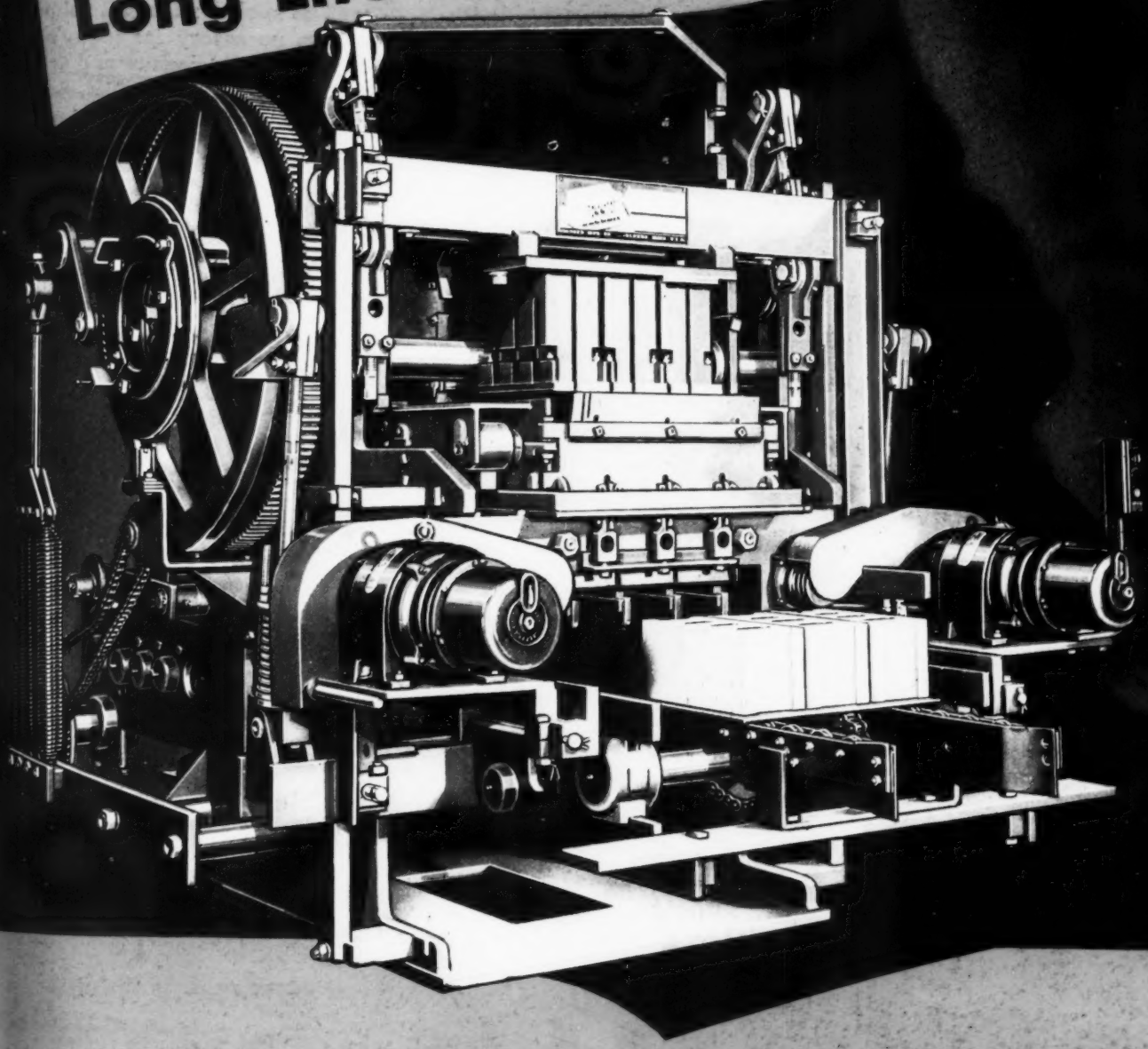

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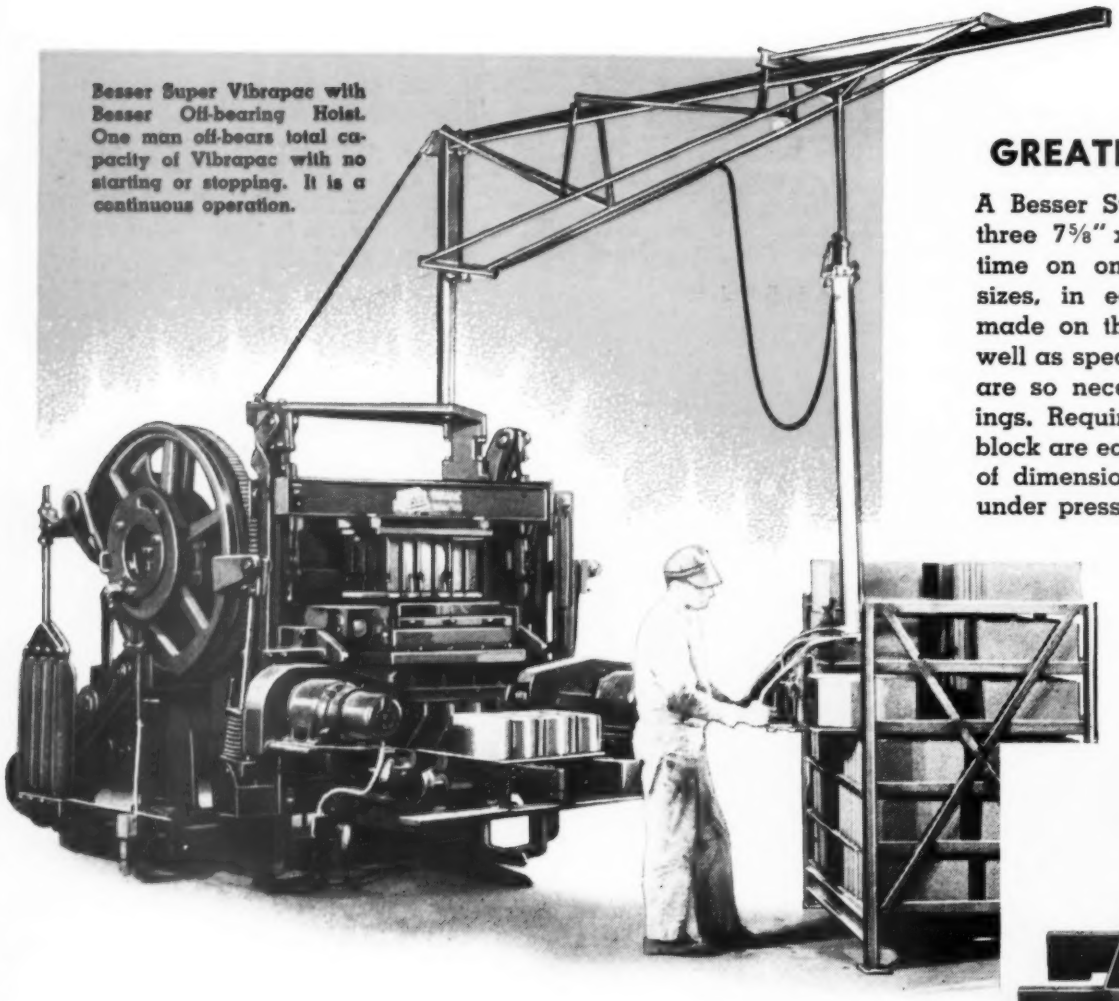

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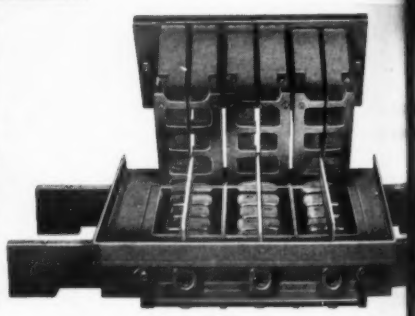

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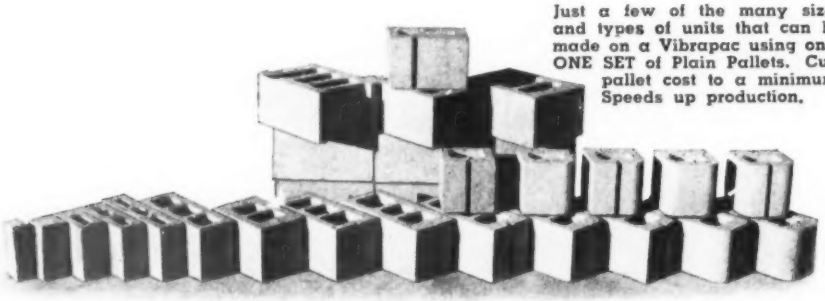

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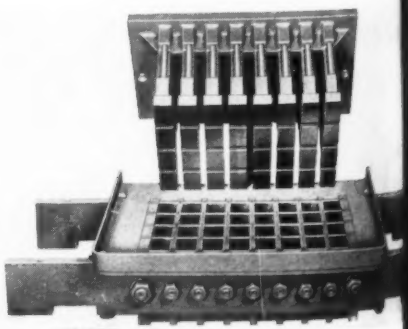

Mold and Stripper Head for brick, size 7⅝" x 3⅝" x 7⅝", making 32 at a time on one Pallet.

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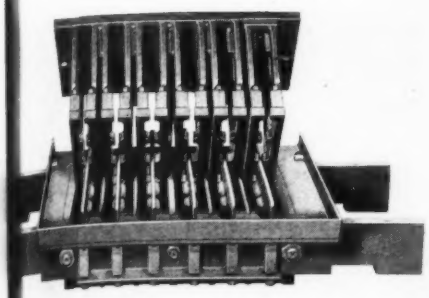
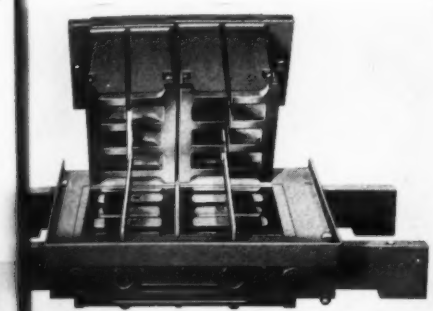
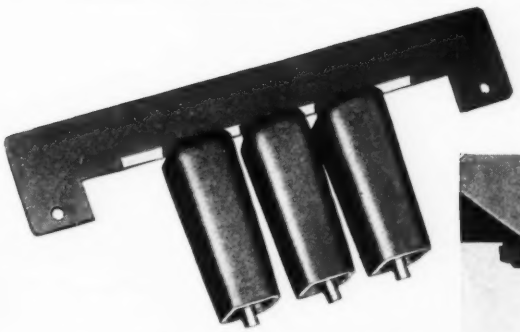


Mold and Stripper Head for 3⅝ x 7⅝ x 15⅝ units, making six at a time, on one Plain Pallet.



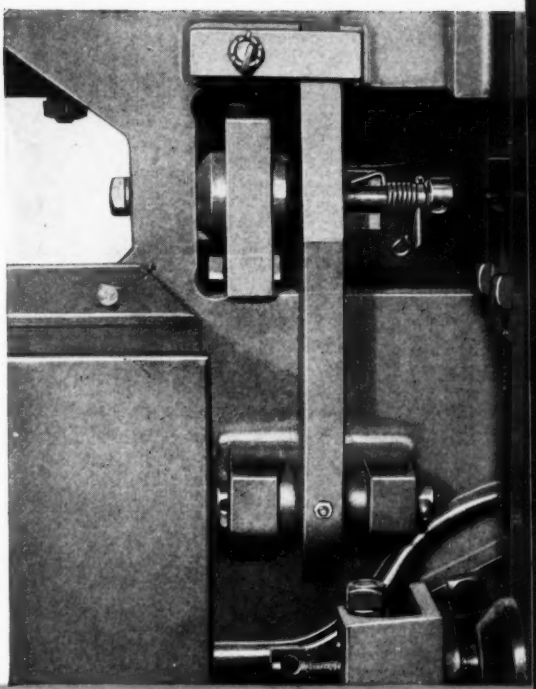
Mold and Stripper Head for 11⅝ x 7⅝ x 15⅝ units, making two at a time, on one Plain Pallet.



Core Assembly for 7⅝ x 7⅝ x 15⅝ mold, with ventilated core. Designed and engineered to give maximum wear. Built with manganese molybdenum alloy steel to give long life.

Instantaneous Mold Release

Illustration at right shows mold lock. No tools required for instantaneous mold release. So engineered that mold attachment changes may be made in less than 30 minutes.



Plain Pallet seals bottom of mold by accurate fitting during vibration. Semi-wet mix, for greater strength units, can be used without "bleeding" of cement, fines or water.

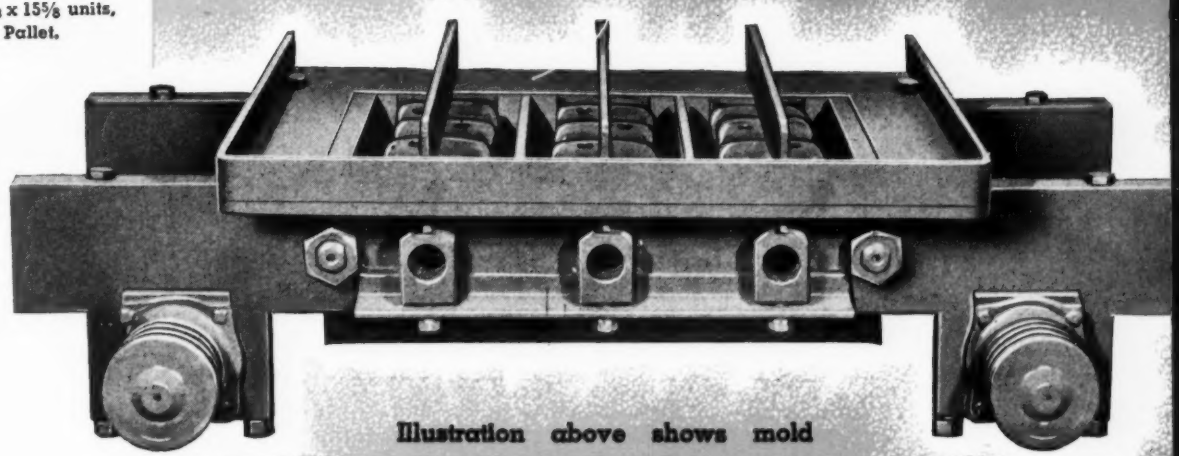
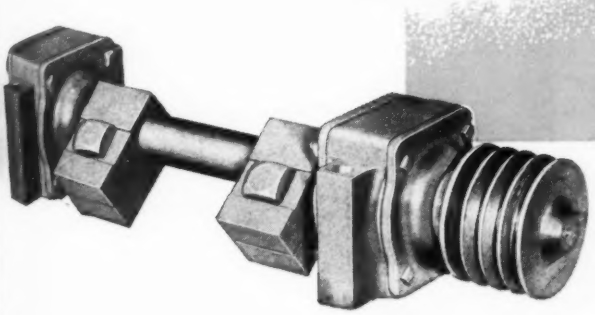


Illustration above shows mold with Vibrating Shafts attached in 7⅝ x 7⅝ x 15⅝ sizes.



Vibrating Shaft for regular size molds. Two shafts needed for mold, giving ample vibration necessary to make quality block.

BESSER MANUFACTURING COMPANY

ALPENA, MICHIGAN, U.S.A.

BESSER SUPER VIBRAPAC

Built for Economical Operation

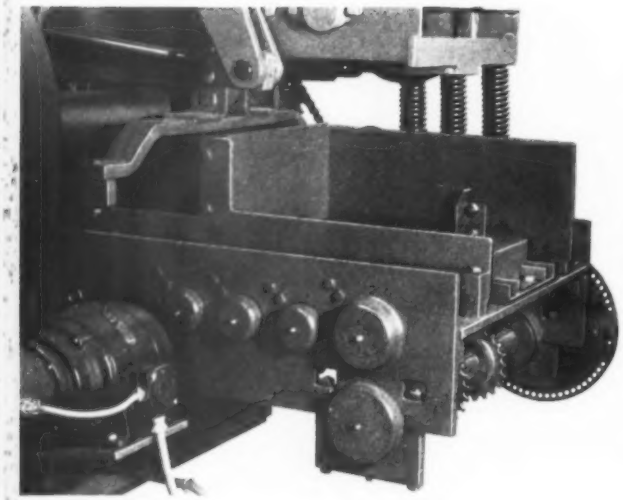
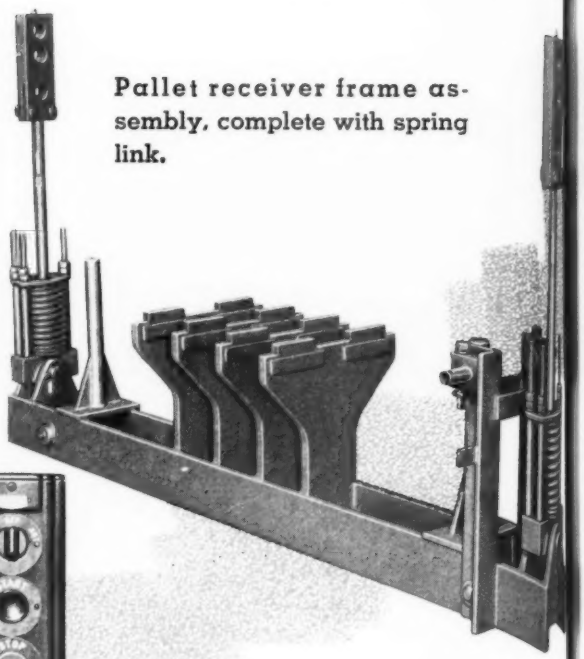
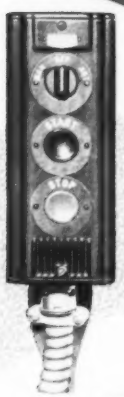


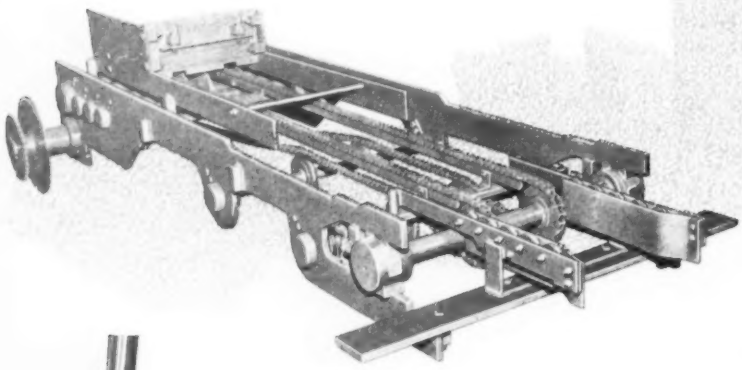
Illustration above shows pallet magazine and drive motor of Super Vibrapac.

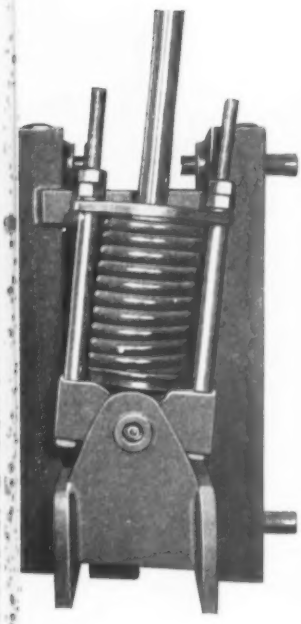


Pallet receiver frame assembly, complete with spring link.



Automatic push button control. Eliminates need for a machine operator.

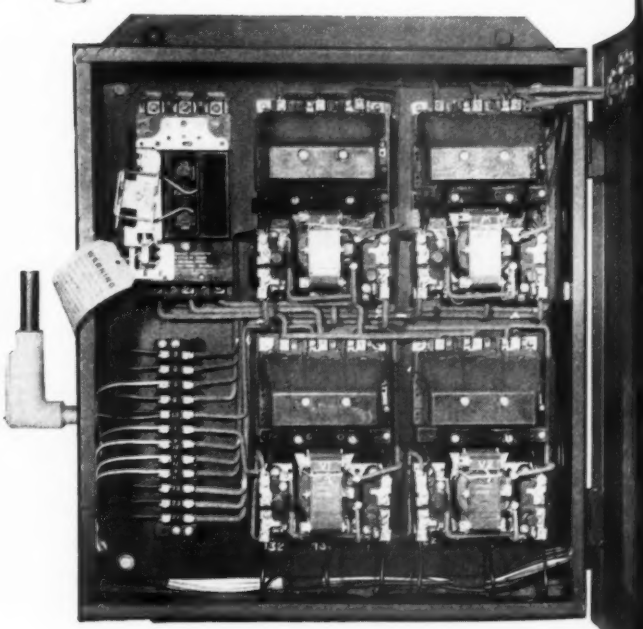




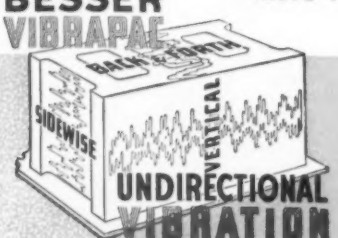
(Above) — Pallet conveyor track assembly.

(Left)—View of lower end of spring link assembly on pallet receiver frame.

(Right) — Electrical panel box on Super Vibrapac. Completely wired at the Besser factory. Makes for compactness and ease of installation of Vibrapac in products plant.



UNDIRECTIONAL VIBRATION — The mold rests on rubber and is free to vibrate in any direction. With no metal-to-metal contact between mold and fra there is no crystallization of steel and vibration sound is minimized.

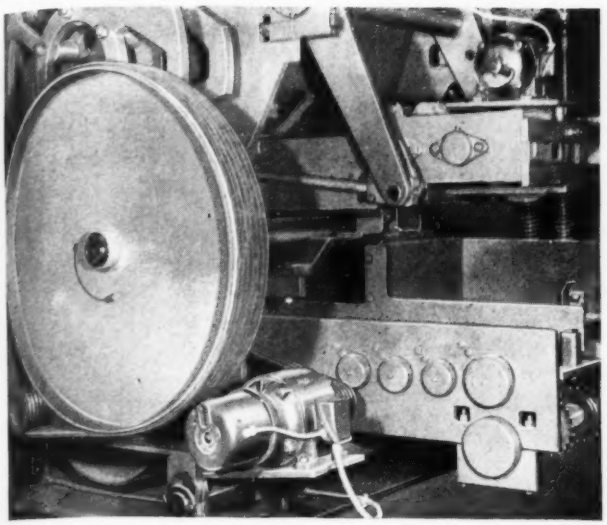


BESSER MANUFACTURING COMPANY

ALPENA, MICHIGAN, U.S.A.

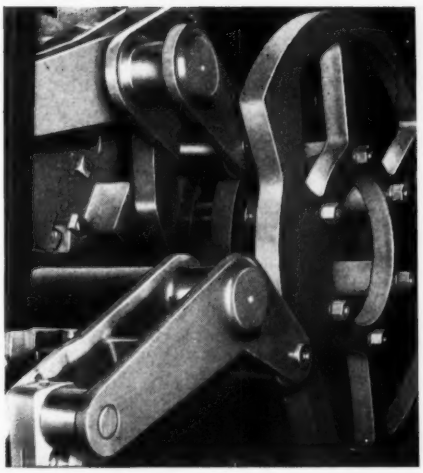
BESSER SUPER VIBRAPAC

Built for Longer Life!

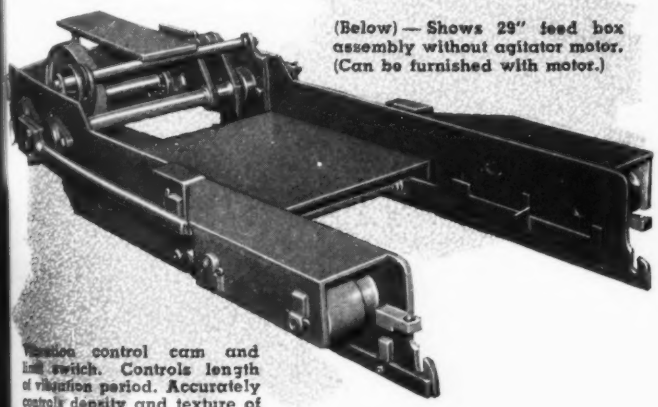


Multiple V-belt drive and electric motor. Power transmission is made positive by the wedging grooves in the sheaves. Smooth running and slipless. Absorbs starting shock. Unaffected by dust, dirt or moisture.

(Above) — Rugged main cam shaft assembly. Built to last for years. Low maintenance cost.

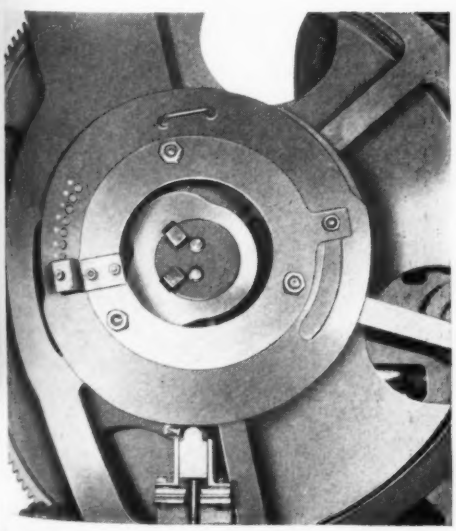


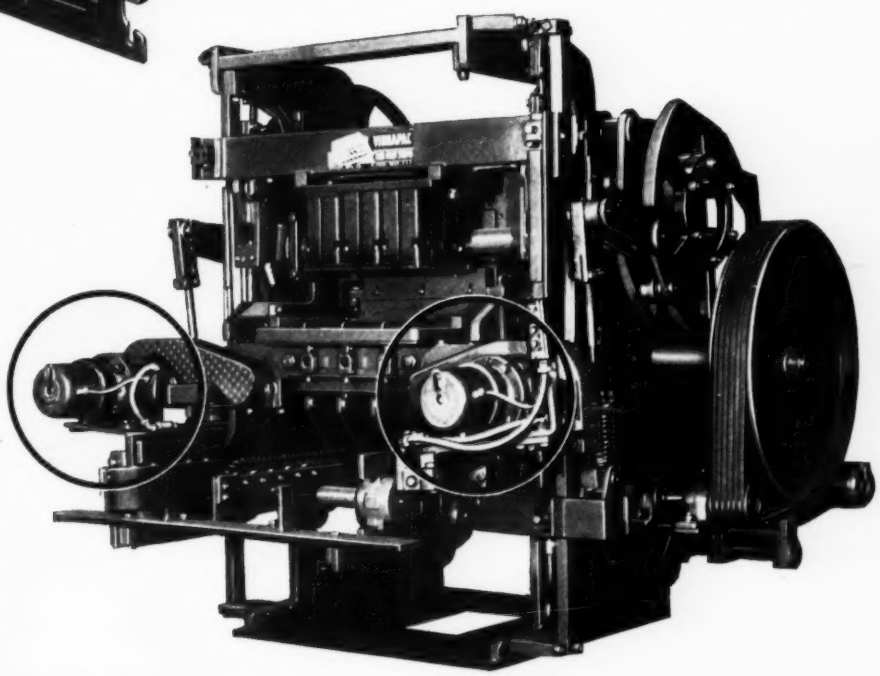
(Left) — Illustrating cam and roller principle of Super Vibrapac. Few moving parts. High production with slow cam-controlled moving parts. Insures long life of machine.



(Below) — Shows 29" feed box assembly without agitator motor. (Can be furnished with motor.)

Vibration control cam and limit switch. Controls length of vibration period. Accurately controls density and texture of block.





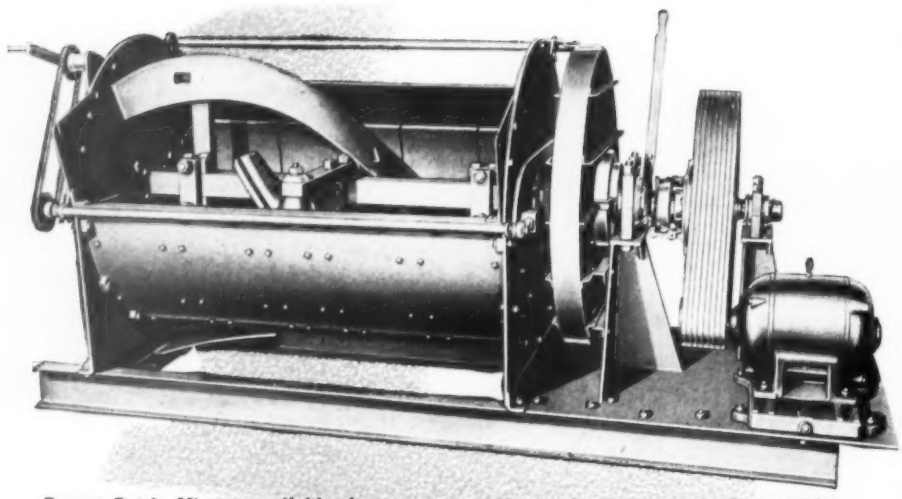
Super Vibrapac, showing the two 5 H.P. vibrating motors.

BESSER MANUFACTURING COMPANY

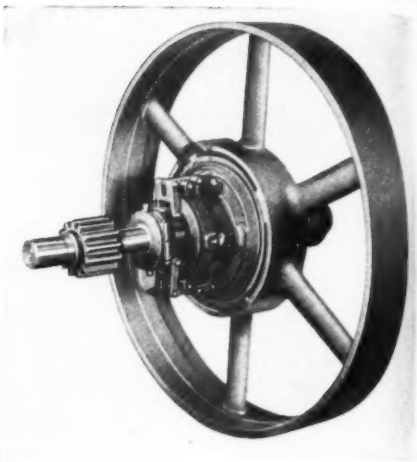
ALPENA, MICHIGAN, U.S.A.

BESSER PLANT EQUIPMENT

Mixers...Racks...Lift Trucks...Cubing Hoists, etc.



Besser Batch Mixers available for concrete products plants in standard capacities: 5-12-18-25-30-40 and 50 cubic feet. Equipped with motor and Vee belt drive. Pulley for flat belt drive, if desired. Grid and extension for placing bag cement is optional equipment. Illustration above shows 50 cu. ft. model without grid or extension.

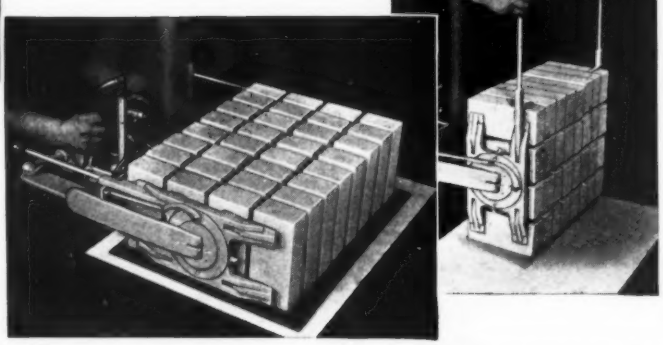


Clutch assembly and drive pulley for Besser 50 cu. ft. Batch Mixer.

Lift Truck delivering block from Vibrapac machine to curing room. Also carries block from curing room to yard. Simplifies block transportation.

Portable Cubing Hoist for removing and cubing by power, cured block made on 26" pallets. Eliminates chipping of corners or edges. Speeds up handling.

Lift Truck loading brick onto motor truck. Also lifts brick or block into stock piles or freight cars. Saves manpower. Speeds up job.



Besser Brick Clamp for fast and safe handling of concrete brick. Powered by compressed air. Interchangeable with block cuber clamp on either portable or stationary model. Operated by same air cylinder and hoist.

Fig. 1 shows brick clamp grasping 32 brick as made on Plain Pallet.

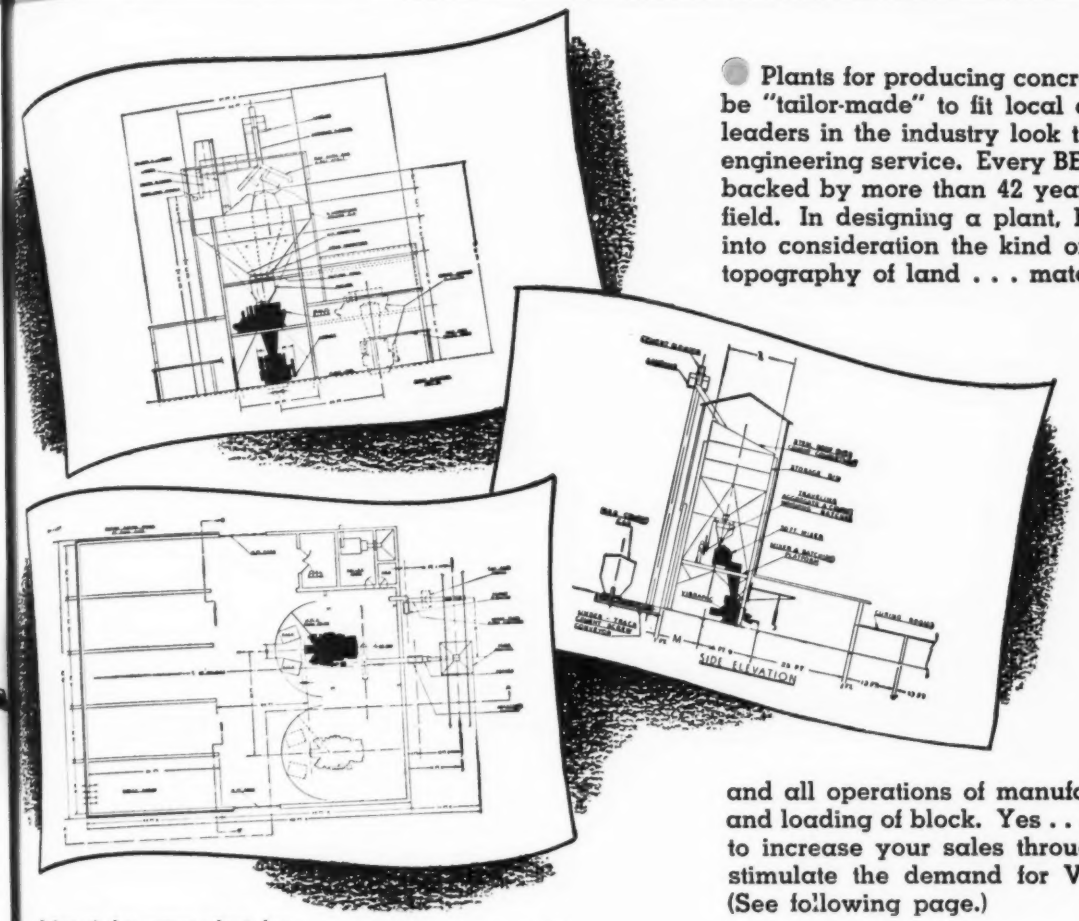
Fig. 2 shows brick in vertical position for storing.

BESSER MANUFACTURING COMPANY

ALPENA, MICHIGAN, U.S.A.

BESSER Engineered PLANT DESIGN

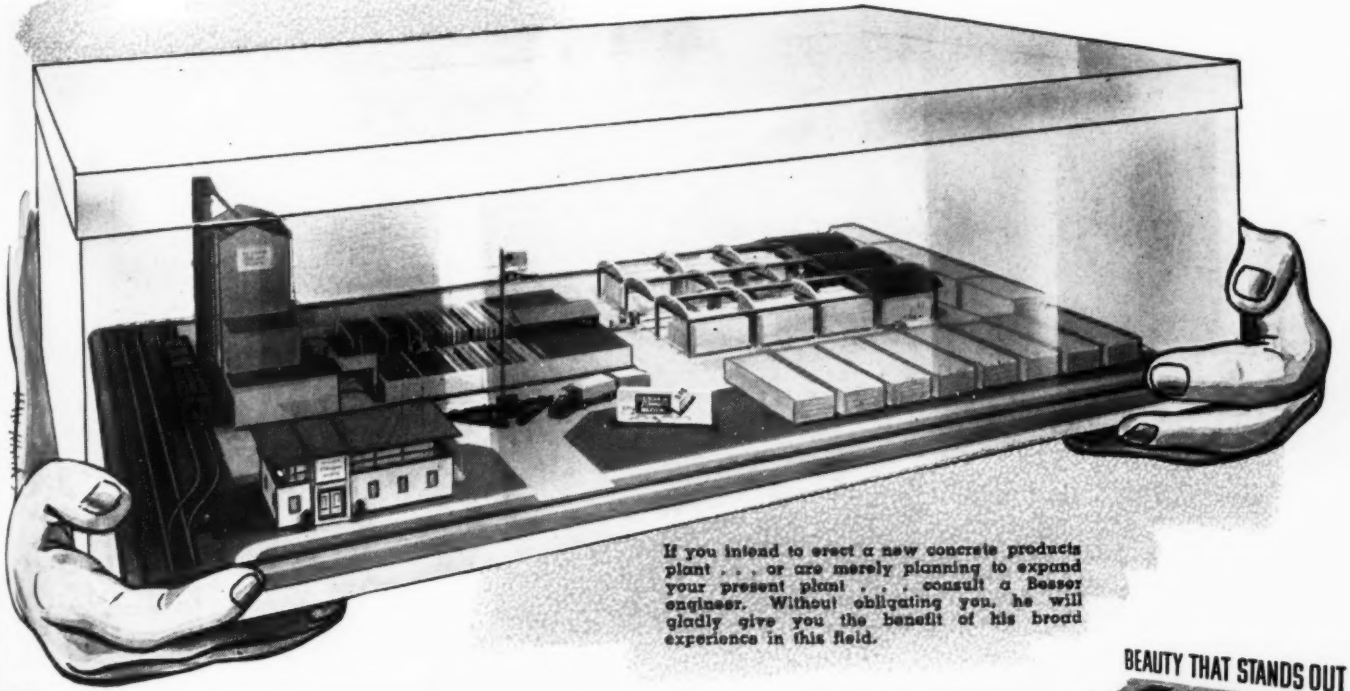
A Complete Products Plant in One Package



A few of the many plant layouts suggested by Besser engineers.

Plants for producing concrete masonry units must be "tailor-made" to fit local conditions. That's why leaders in the industry look to BESSER for complete engineering service. Every BESSER designed plant is backed by more than 42 years of experience in this field. In designing a plant, BESSER engineers take into consideration the kind of materials to be used, topography of land . . . material handling methods . . . potential plant output . . . space for storing blocks . . . and other factors. When completed, a BESSER designed plant meets the needs for speed and economy, and produces PROFITS for the owner.

Besser plant engineering service covers specification of all necessary equipment for handling and processing aggregates and other materials, and all operations of manufacture, curing, handling and loading of block. Yes . . . and Besser even helps to increase your sales through advertising helps to stimulate the demand for Vibrapac Quality Block. (See following page.)



If you intend to erect a new concrete products plant . . . or are merely planning to expand your present plant . . . consult a Besser engineer. Without obligating you, he will gladly give you the benefit of his broad experience in this field.

BEAUTY THAT STANDS OUT

QUALITY THAT STANDS UP

BESSER MANUFACTURING COMPANY

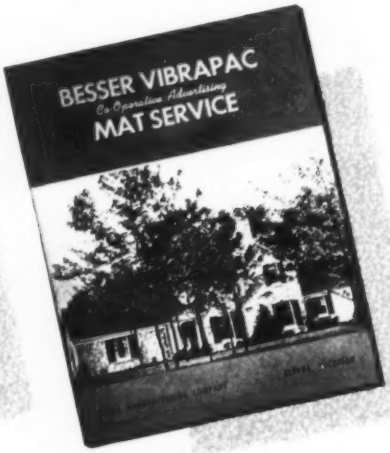
ALPENA, MICHIGAN, U.S.A.

BESSER Helps To Promote The Sale O
CONCRETE MASONRY UNITS

CONSUMER BOOKLET
Presents advantages of Concrete Masonry construction from standpoint of home owner. 24 pages, profusely illustrated. Imprinted with Vibrapac Plant operator's name and address. A nominal charge is made for these booklets.

● **The Besser Manufacturing Co. does more than merely supply products plants with efficient, high-production concrete block machines. Besser assists every Vibrapac owner in the sales promotion and constructive utilization of concrete masonry . . . supplying effective literature, newspaper advertisements, mats for electros, radio script, etc. We urge every plant operator to use these selling aids . . . NOW . . . for a better recognition of concrete masonry as an ORIGINAL building material, and to assure increased Vibrapac Block production in future years.**

MODULAR DESIGN — Booklet dedicated by Besser to Vibrapac owners and the building profession. Shows how to add beauty and utility to conventional architecture with Besser Modular dimension block, brick and tile.



MATS FOR ELECTROS—Individual mats for electros of any or all of Besser modular standard units may be obtained free of charge for use in locally prepared newspaper advertisements or printed matter.

CARTOON SERIES OF ADS — Sell the consumer on the merits of Vibrapac block in a new and interesting manner. This series of ads is different. Amusing, and yet convincing. Mats supplied free.

RADIO SCRIPT—Supplement your newspaper block advertising with radio spot 45 second announcements. Besser will gladly furnish Vibrapac owners with radio script, each one a convincing sales message, brief but to the point.

Now is the time to start an intensive advertising campaign in your community. Sell both contractor and consumer on the merits of Vibrapac block. Besser sales aids, shown here, will simplify the job. Write today for further facts.

CONCRETE MASONRY makes this home FIRE-SAFE
CONCRETE MASONRY Gives this Home GREAT DURABILITY
Permanent the Pyramids!
CONCRETE MASONRY Rates Top Preference FOR ALL TYPES OF COMMERCIAL BUILDINGS
CONCRETE MASONRY is extensively used in THE FINEST BUILDINGS
BE GUIDED BY THE EXPERIENCE BUILDING EXPERTS!
CONCRETE MASONRY Makes Better FARM BUILDINGS
CONCRETE MASONRY
Fire Prevention is Better than Fire Insurance!

NEWSPAPER ADVERTISEMENTS — A carefully prepared series of 26 newspaper advertisements in 2 sizes (3 column x 9 inches and 2 column x 6 inches) is available in mat form. Each mat is complete with illustrations and copy. Entire 6 Months' Campaign (one ad each week) sent free to all Vibrapac owners.

BESSER MANUFACTURING COMPANY

Complete Equipment for Concrete Products Plants

ALPENA, MICHIGAN, U.S.A.

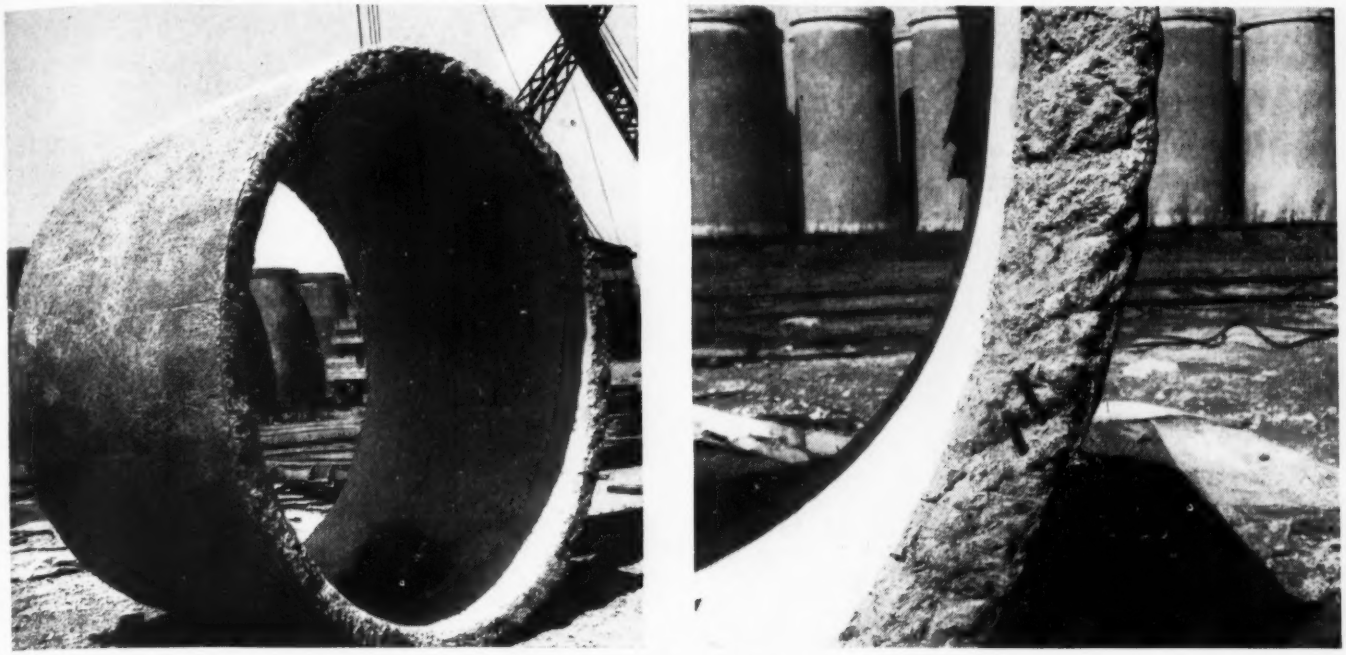


Fig. 11. Section of one pipe, left over from the other, used in making the 3-edge and crushing tests, described in the text, and a close-up view of the 5.75 in. shell of the 84 in. diameter pipe

Montreal Water Pipe

(Continued from page 162)

coupling rings, when the pipe are laid.

Aside from the hydrostatic tests, previously mentioned, the engineers wanted some handling tests made. One pipe was lifted horizontally by slings at each end; then it was lifted with a sling at the center. It was then rolled on a flat surface, its weight supported by the flanges at each end, all of which produced no deflection. The pipe was then balanced on a single knife-edge at the center, with no deflection. Slung from its quarter points, the pipe was dropped on a steel rail—placed at right angles to it—then it was dropped from one and from two feet, with no measurable deflection; only the cover-coat was scored. This is a remarkable performance as the pipe weighs 16 tons. Other tests were made of a 4.5 ft. section cut from the center section of the pipe, including 3-edge and crushing tests—the latter was only affected when a 40-ton weight was dropped on this 4.5 ft. section, cut from the same pipe that had taken all the punishment mentioned. The section was broken clean at the four quarter points; the bond of the gunite cover-coat was excellent, there was no spalling and no flying of the wire. The cut section is shown in Fig. 11 and the hydraulic tester in Fig. 12.

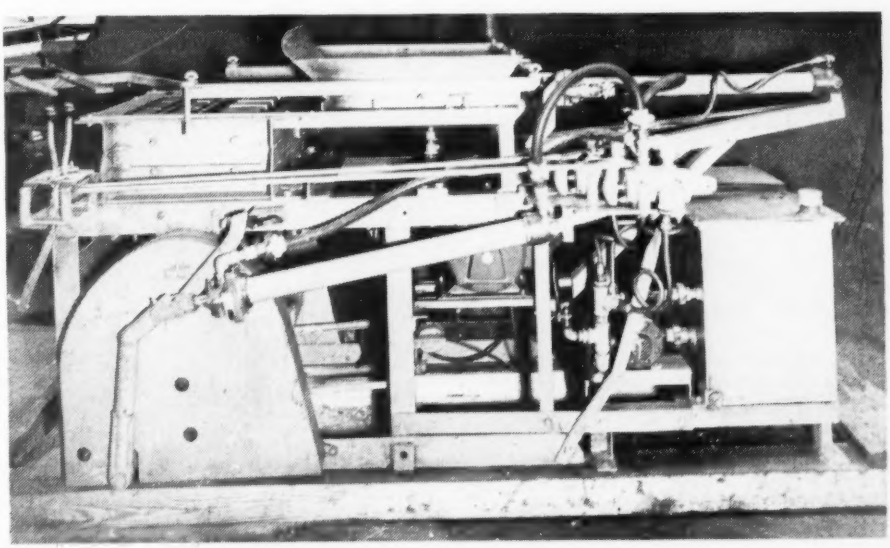
Hydraulic Block Machine

ALLIED WELDING & MANUFACTURING Co., Orlando, Fla., has announced that it is now in production on a hydraulically operated block machine. This company developed and patented a block machine in 1941, but the War caused a cessation of manufacture and all facilities were devoted to the war effort. With the end of the War, development and production of the machine was resumed.

It is of all-welded construction. Vibration is imparted to the cores which are given a circular movement. This action is obtained by using a patented twisted core mount on balanced vibration. The vibration bar, which has a six-point suspension to make adjustment easy, is suspended at the front and rear of the mold box, and it has a spring suspension at the rear of the vibrator bar at the point where power is applied.

Block ejection is by means of an elevator that operates by lever moving quadrants. Block machines are manufactured in both single and double units of either two- or three-core types. Self-feeding hoppers are available for both the single or double machines. Mixers can be obtained in one- or two-bag sizes.

The latest type hydraulic block machine is operated by two hydraulic cylinders. One cylinder moves the strike off box, giving a direct thrust forward and back. The other cylinder operates the block ejector. This ejector has not been changed in the latest model as the cylinder is attached to the rod that was connected to the manually operated handle. Valves are directly controlled by remote control extension rods from the valves to operating position at the front of the machine. Pump, valves and main section of the hydraulic machine are mounted at the rear to give more floor space and have all parts in plain view.



Hydraulically operated block machine

CONCRETE For Products Plants

Practical methods of proportioning to obtain accurate control of aggregates and water for economical use of cement

By BENJAMIN WILK* and WILLIAM GRANT†

IN the February 1947 issue of ROCK PRODUCTS there appeared an article by Benjamin Wilk on the "Influence of Grading on Strength of Concrete" which recommended for concrete products plants a combined aggregate having a fineness modulus of 3.70. Three sizes of aggregates were suggested: 40 per cent roofing gravel, 40 per cent coarse sand and 20 per cent fine sand. Tables I and II are slightly revised versions of the tables shown in the February, 1947, article. Revisions are based on check tests made during the past year.

To make practical use of the results shown in Table I, in the proportioning of concrete in concrete products plants it is important to have accurate control of the aggregates as well as the amount of water. Without such control, there is usually a wide variation in the finished product, so that either cement is wasted or 100 per cent of the product will not meet specifications.

As the products manufacturer uses aggregates usually up to ⅜ in. in diameter, the problem of water content in the aggregate is very important. Tests show that sand may vary widely in water content from 1 per cent to 8 per cent and that due to bulking, these variations mean a decided change in the actual amount of solid aggregate in a cubic foot or cubic yard of the aggregate as it is dumped into the mixer. Table 3 shows the bulking effect of moisture on sand.

Various methods have been suggested for determining the percentage of surface moisture in sands. The most direct method is to actually dry out a weighed sample of the moist sand. Such a sample may be one or two pounds accurately weighed in a shallow pan of known weight. The sample is then subjected to heat until the surface moisture is driven off. This can be determined by testing to see when the sand will run as in an hour glass. Drying may be done in a hot oven or on an electric plate. An alternate method of drying is done by means of denatured alcohol. About ⅓ to ½ cupful of the alcohol per pound of aggregate is poured over the sand which is stirred with an iron rod until thoroughly wet. The alcohol is ignited and during the burning the contents of the pan may be stirred. Repeat the operation if the material does not run when tested. Allow contents of pan to cool, then weigh. The difference in weight is the total amount of moisture contained in the sample. The calculation is simple.

$$\text{Specific gravity} = \frac{\text{weight of dry sand}}{\text{weight of equivalent volume of water}}$$

A = weight of damp sample
B = weight of dried sample

$$\text{Per cent of moisture} = 100 \times \frac{(A - B)}{B}$$

The dry weights are easily converted to damp weight by the use of the percentage correction factor. For example, assume that the mix calls for 1400 lbs. of dry sand and 2000 lbs. of roofing gravel. Actual determination shows the sand to contain 5 per cent free moisture and the roofing gravel 2 per cent. Then: Sand 1400 × 1.05 = 1470 lbs. damp weight. Roofing gravel 2000 × 1.02 = 2040 lbs. damp weight. Determination of the moisture content by inundation may be accomplished quickly by the following method: Generally the specific gravity of sand in a locality is known, but if it is not, it can be determined by weighing a dried sample in air and in water. The volume of water displaced by the sand is the equivalent weight of water. Assume the specific gravity equals 2.63. Use a container large enough to hold approximately 2000 cubic centimeters. Determine the exact volume of the container in cubic centimeters. Fill container partly full of water. Pour in slowly the damp sand equivalent in weight in grams to 1000 times the specific gravity of sand. With 2.63 specific gravity pour in 2630 grams of sand. Fill container to over-flowing. Weigh the container and contents. The percentage of moisture can be determined from the fact that the differ-

(Continued on page 174)

*General Manager, Standard Building Products Co., Detroit, Mich.
†Chemical Engineer, Department of Buildings and Safety Engineering, City of Detroit.

TABLE 1.

SERIES 1. Test No.	Roofing Gravel Grams	Coarse Sand Grams	Fine Sand Grams	F. M. of Mixed Aggregate	Percent Water	Compression Strength per Sq. In.	Average per Sq. In.
1	500	500	0	4.30	7.0	3309 3638 3169	3372
2	475	475	50	4.16	7.0	3290 3340 3280	3303
3	450	450	100	4.02	7.0	3409 3353 3285	3349
4	425	425	150	3.88	7.0	3406 3635 3346	3462
5	400	400	200	3.74	7.5	3088 3337 3124	3182
6	375	375	250	3.59	7.5	2571 2454 2599	2541
7	350	350	300	3.44	7.5	2142 2133 2053	2110
8	325	325	350	3.30	7.5	1821 1820 1782	1807
9	300	300	400	3.16	8.0	1693 1430 1527	1550
10	275	275	450	3.02	8.5	1527 1326 1532	1462

NEW MACHINERY

Automatic Block Machine

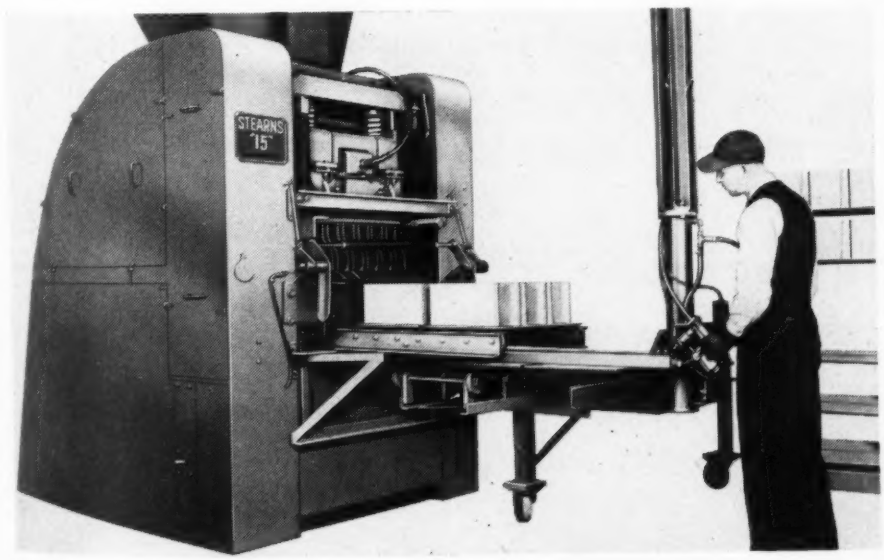
STEARNS MANUFACTURING CO., INC., Adrian, Mich., has just released an announcement about its Model 15, automatic plain pallet block machine which has been going through a testing period in several installations.

It is a high production machine, and once the starting button is pressed it operates automatically without further manipulation or man power. The concrete mix is received from above and is delivered to its pallet load of blocks at the front end of the machine. On a conveyor directly below this point, the machine receives and takes away the empty pallets.

The pneumatic offbearer, which has two arms sufficiently long to carry two loaded pallets on top, picks up and carries by magnetic force two empty pallets tightly held against the bottom of the arm. With one-man operation, two pallets loaded with block are placed on the rack with the power offbearer and simultaneously, by magnetic force, two empty pallets from the next deck underneath are removed from the rack and placed on the pallet conveyor at the front of the machine and immediately below the point at which two pallets loaded with block have already been delivered to the front of the machine. From the front of the machine, the pallet conveyor carries the empty pallets to the pallet magazine at the rear of the machine during which time they are mechanically brushed, flooded with oil, and wiped. The manufacturer points out that this entire operation, plus the use of the Stearns Yardhoist in the storage yard eliminates all handling of pallets by hand.

Quality and production of any particular kind of mix and shape of unit is quickly attained by a control knob at the front of the machine. The No. 15 model has a production range of from 12 to 18 of the 8- x 8- x 16-in. block per minute. Attachments are available to make a wide variety of sizes and types of precast concrete building units on a proportionate production basis.

One of the reasons given for the high production and uniform density of the units is the patented method of vibrating the pressure head as well as the mold assembly. The mold box vibration is transmitted by a high speed unbalanced shaft in the manner used for years on Joltcrete machines. Pressure head vibration is applied by a heavy duty Syntron. More than 30 machines of the No. 15 model are in operation, some for more than a year. This model weighs about 8½ tons, and has wide vertical frame members which give lateral stability to the machine and provide housing for the moving parts which are covered.



Automatic, plain-pallet, high-production block machine

Ready mixed concrete trucks mounting mixers of 3 cu. yd. capacity

Trucks for Transit Mixers

FOUR WHEEL DRIVE AUTO CO., Clintonville, Wis., has brought out a complete line of trucks for use with every standard type of transit concrete mixer. Many advantages are claimed for the four-wheel drive in pulling ready mixed concrete trucks over difficult terrain.

Standard HR model is recommended for the 2-cu. yd. mixer. Two models are available for 3-cu. yd. mixers; the HA equipped with an auxiliary rear axle for weight carrying ability and the standard Model SU. For 4½-cu. yd. mixers, Model M7 or the Model HR equipped with an auxiliary rear axle is recommended. For the heavier 5½-cu. yd. mixer, the M10 and the Model SU equipped with an auxiliary rear axle is offered.

Motorized Wheelbarrow

WHITEMAN MANUFACTURING CO., Los Angeles, Calif., has developed the Power Buggy, a motorized wheelbarrow and dump truck to haul concrete, aggregates and other material. This 6-hp. unit hauls 2000 lbs. or 12 cu. ft. at speeds from 2 to 15 m.p.h., and can operate up a 25 deg. slope with a load. It can turn in its own radius.

Hauling concrete with a motorized wheelbarrow

Oil-Resistant Rubber Canvas

THE B. F. GOODRICH CO., Industrial Products Sales Division, has announced the addition of four styles of oil-resistant rubber canvas gloves and gauntlets. Gloves of this material undoubtedly can be used by employes in a number of rock products' operations.

(Continued from page 172)

ence in weight between a cubic centimeter of sand and a cubic centimeter of water is 2.63 grams, minus 1.00 gram equals 1.63 grams. Using 2630 grams of damp sand, a difference of 1 per cent of moisture would mean that in the sand there is a decrease of 26.3 grams in sand weight and an increase of 10 grams in water weight or a net decrease of 16.3 grams. Thus a 1 per cent increase in moisture in the sand means a uniform decrease in weight of the filled container of 16.3 grams. From this observation a chart can be prepared which can readily be used to compute the percentage of moisture in the damp sand.

With this percentage determined, reference should be made to Table 3 and corrections made in the proportioning of the roofing gravel, coarse sand, fine sand and cement so that the solid volume of material is the actual measurement rather than the measurement of the damp materials. It is evident from Table 3 that the actual amount of sand in a cubic foot of 5 per cent to 7½ per cent moist sand is only 80 per cent of the actual amount of sand in a 1 per cent moist sand. Products manufacturers know that percentage of moisture varies from load to load and also at different times of the day. In the first hour of daily operation the accumulated water at the bottom of the bins will seriously affect the moisture content of the aggregate. It is suggested that a moisture determination be made at least several times a day, preferably hourly.

Many block plants are today operated on the volume system. This method, if carefully handled is capable of producing satisfactory results provided certain precautions are observed. Consider the following which is an example in actual practice. Both the gravel and sand weigh the same per cubic foot when in the dry state, namely 110 lbs. The relative proportions are the same whether measured by volume or by weight. The batcher holds approximately 21.9 cu. ft. and is divided in such a manner as to approximate a 60 per cent roofing gravel to 40 per cent sand mix. The space

TABLE 3
EFFECT OF MOISTURE ON SANDS
Medium Sand 0-#8
Fineness Modulus 2.30

	Dry Rodded	Dry Loose	Loose	Loose	Loose	Loose	Loose	Loose	Inundated
% Water by Weight	0	0	1	2.5	5	7.5	10	15	20
% Bulking	0	5.8	15.2	34.5	43.3	41.0	38.6	24.6	2.3
% Loss Per Cu. Ft.	0	5.2	13.2	25.6	30.2	29.0	27.7	19.7	2.2
Wt. Per Cu. Ft. Including Water	108.0#	102.0#	94.5#	82.4#	79.3#	82.4#	85.8#	99.5#	127.0#
Wt. Dry Sand in 1 Cu. Ft.	108.0#	102.0#	93.6#	80.4#	75.5#	76.6#	78.0#	86.6#	106.0#

containing the gravel equals 13.14 cu. ft., while that for the sand equals 8.76 cu. ft. If dry materials are put into their respective compartments and then rodded, the results are as follows:

60 per cent or 13.4 cu. ft. × 110 lbs. = 1445 lbs. gravel
40 per cent or 8.76 cu. ft. × 110 lbs. = 964 lbs. mixed sands

Total weight of materials = 2409 lbs. dry rodded

If 964 lbs. of dry rodded sand becomes wet, and is found to contain 5 per cent moisture, the grains become coated with moisture which forces them apart, causing bulking. The bulking effect varies with the type of sand, but may be conservatively estimated at 25 per cent. If the 8.76 cu. ft. compartment is filled with the damp bulked sand, the weight of the damp bulked sand in the compartment is only 810 lbs. instead of 964 lbs. of dry sand. If the 810 lbs. of damp sand is dried there remains only 771 lbs. of available dry rodded material or 193 lbs. less than originally calculated for a two-sack batch. Otherwise stated 4/5 of 964/1 = 771 lbs. dry sand, taking into consideration the 5 per cent moisture content. Then 5 per cent of 771 lbs. = 39 lbs. contained water. Thus 771 lbs. plus 39 lbs. = 810 lbs. damp bulked sand by weight in 876 cu. ft. volume. Since we have a 60 per cent gravel to 40 per cent sand mix by damp volume in which the sand weighs 810 lbs. and which when dry weighs 771 lbs. the mix changes its proportions when calculated on the dry weight. Thus:

Gravel 1445 lbs. (assumed dry) gives $\frac{1445}{2216}$ = 65.2 per cent

Sand 771 lbs. gives $\frac{771}{2216}$ = 34.8 per cent

The cement ratio becomes 1 part cement to 11.8 parts dry aggregate by weight instead of 1 part cement to 12.8 parts dry aggregate by weight after bulking is considered.

Again 13.14 cu. ft. of gravel—60 per cent
8.76 cu. ft. of sand —40 per cent

by damp volume
actually shows in dry material the following: 4/5 of 8.76 cu. ft. equals 7.01 cu. ft. dry sand. Since no bulking is considered in the gravel the cubical content is the same (namely 13.14 cu. ft.) giving an actual total of 20.15 cu. ft. dry material. Calculated, the actual volume of dry material would show these proportions:

60/40 volume wet becomes
65.2/34.8 mix by weight dry

60/40 volume wet becomes
65.2/34.8 mix by volume dry

since gravel and sand weigh the same per cubic foot dry. From these computations it will be seen how erroneous it is to confuse the division of the batcher in its 60/40 portions by dividing the total length into these proportions. The example given illustrates the importance of determining the moisture in the aggregates.

Proportioning of concrete based on water cement ratio and on solid vol-

TABLE 2.
SIEVE ANALYSIS OF MATERIALS
PERCENT RETAINED

Sieve Size	Roofing Gravel	Coarse Sand	Fine Sand	Actual Combined Grading Series 1 #4	Actual Combined Grading Series 1 #5	Proposed Theoretical Grading
4	70.0	1.0	.3	30.6	28.5	25.0
8	95 0	12.0	.6	45.5	42.9	40.0
14	98.2	33.8	1.5	56.3	53.0	55.0
28	99.5	61.0	10.0	69.7	66.2	70.0
48	99.8	91.0	43.5	87.6	85.0	85.0
100	100.0	97.0	93.0	97.6	97.4	95.0
F. M.	5.63	2.96	1.49	3.88	3.73	3.70

"is it fun to be fooled?"

We don't think so . . . not when it comes to paying out hard-earned dollars for equipment. As manufacturers, we don't like to be fooled in our purchases of machinery and materials. We prefer to *know*. And we want you to know!

This is the reason why we have formed the Truck Mixer Manufacturers Bureau . . . an organization founded on service to you. We have set up certain standards that must be met by each and every truck mixer. The Bureau rating plate, prominently displayed on a truck mixer, is your assurance of full rated capacity . . . your protection against "outlaw sizes." Conversely it is our protection against the loss of your "good will" . . . of the loss of your confidence in our product through inaccurate capacity ratings.

2 CUBIC YARD MIXER
GUARANTEED TO HOLD, MIX AND AGITATE ITS RATED CAPACITIES AND CERTIFIED TO COMPLY WITH TRUCK MIXER MANUFACTURERS BUREAU STANDARDS AS APPROVED BY N.R.M.C.A.
NRMCA
3 CUBIC YARD AGITATOR
N.R.M.C.A. REGISTRY No.

Truck Mixer Manufacturers Bureau

Affiliated with The National Ready Mixed Concrete Association

BLAW-KNOX DIVISION Pittsburgh, Pa.	CONCRETE TRANSPORT MIXER CO. St. Louis, Mo.	RANSOME MACHINERY COMPANY Dunellen, N. J.
CHAIN BELT COMPANY Milwaukee, Wis.	THE JAEGER MACHINE COMPANY Columbus, Ohio	THE T. L. SMITH COMPANY Milwaukee, Wis.

(Continued from page 174)

ume calculations has been analyzed by many experimenters, but their work has been primarily in so-called wet concrete as for structural or road purposes. The water-cement ratio as such cannot be used in products plants because the produced concrete is on the dry side. A good general rule to use, however, is to use as much water as possible without allowing the product to slump. It will probably be found that with thorough mixing such an amount of water will produce the maximum efficiency of the cement.

From the standpoint of the products manufacturer local specifications must be met and local aggregates must be used. It is his problem to use the available aggregates to best advantage to produce a uniformly satisfactory product at lowest cost. Generally he must meet a specification of 1000 p.s.i. of gross area of block.

TABLE 4.
SCREEN ANALYSIS
MATERIALS USED IN EXPERIMENTAL SERIES

	Roofing Gravel			Sharp Sand			Flat Sand		
Screen	Cum. Grams	% Retained	% Pass	Cum. Grams	% Retained	% Pass	Cum. Grams	% Retained	% Pass.
3/8	0	0	100	0	0	100	0	0	100
4	150	15.0	85	0	0	100	0	0	100
8	950	80.0	5	35	3.5	96.5	0	0	100
14	980	3.0	2	210	17.5	79.0	55	5.5	94.5
28	985	.5	1.5	380	17.0	62.0	155	10.0	84.5
48	990	.5	1.0	730	35.0	27.0	510	35.5	49.0
100	998	.8	.2	965	23.5	3.5	855	34.5	14.5
F. M.	5.05			2.32			1.57		

TABLE 5
RANGE OF AGGREGATE MIXES AND COMPRESSIVE STRENGTH RESULTS

Test No.	Agg. Mix Dry Weight	Mix Damp Volume	F. M. Mixed Sand	F. M. Mixed Agg.	Grams Dry Aggregate	Grams Cement	% Water 4895 Gms. Dry Mix	Compression Strength Psi
1	60/40 Gravel and Sharp Sand	54.5/45.5	2.32	3.96	G 2700 SS 1800	395	360 CC 7.35	1769 1736 } 1727 1676 (1)
2	65/35 Gravel and Sharp Sand	59.8/40.2	2.32	4.09	G 2925 SS 1575	395	7.35	2134 2267 } 2188 2163 (2)
3	70/30 Gravel and Sharp Sand	65.1/34.9	2.32	4.23	G 3150 SS 1350	395	7.35	2390 2462 } 2432 2445 (3)
4	60/40 Gravel and Mixed Sands 80/20	54.5/45.5	2.17	3.90	G 2700 SS 1440 FS 360	395	7.35	2161 2224 } 2168 2118 (4)
5	65/35 Gravel and Mixed Sands—80/20	59.8/40.2	2.17	4.03	G 2925 SS 1260 FS 315	395	7.35	2168 1933 } 2022 1964 (5)
6	70/30 Gravel and Mixed Sands—80/20	65.1/34.9	2.17	4.18	G 3150 SS 1080 FS 270	395	7.35	1880 2034 } 1934 1889 (6)
7	60/40 Gravel and Mixed Sands—75/25	54.5/45.5	2.13	3.88	G 2700 SS 1350 FS 450	395	7.35	2028 1982 } 1972 1905 (7)
8	65/35 Gravel and Mixed Sands—75/25	59.8/40.2	2.13	4.02	G 2925 SS 1180 FS 395	395	7.35	1988 1889 } 1974 2046 (8)
9	70/30 Gravel and Mixed Sands—75/25	65.1/34.9	2.13	4.17	G 3150 SS 1012 FS 338	395	7.35	2165 2079 } 2138 2176 (9)
10	60/40 Damp Vol. 65.2/34.8 Dry Wt. 2 Sharp—1 Flat Sand	Plant Mix 60/40	2.07	4.01	G 2934 SS 1044 FS 522	395	7.35	1797 1803 } 1789 1767
11	60/40 Damp Vol. 65.2/34.8 Dry Wt. 2 Sharp—1 Flat Sand	Plant Mix 60/40	2.20	4.05	G 2934 SS 1044 FS 522	395	7.35	2020 2197 } 2059 1960

(1) Compression strength results obtained on 3"x6" cylinder specimens.
(2) Aggregate and cement dry mixed for 2 minutes then for 5 minutes after water was added.
(3) Cardboard moulds filled with concrete vibrated 1 minute on Syntron vibrator.
(4) Each series of tests consisted of 3 specimens.
(5) Specimens cured in water for 21 days then at room temperature for 7 days.
(6) Cylinders capped with Plaster of Paris and Lumnite Cement Mixture. Then tested on 30,000 lb. capacity machine.
(7) Breaks all showed typical conical shears.
(8) Structurally each series showed a well compacted, dense concrete.
9) Careful study of the various series indicates that test No. 4 is the most satisfactory from all standpoints.

A Detroit manufacturer conducted an extensive series of tests, using representative samples of the aggregates being processed in the plant at that time. The objective in mind was to blend the materials on hand to approximate the theoretical aggregate with a fineness modulus of 3.70. Table 4 shows the grading of the aggregates which were used while Table 5 gives a detailed outline of the combinations and the resultant compressive strengths obtained. It will be noted that tests 1-2-3 were made without fine sand. In tests 4 to 11 various combinations with fine sand were used. Test No. 3 from a strength standpoint shows the best results, but is too coarse from a marketing standpoint. Test No. 4 gave the best all round result being dense and texturally good. A study of the screen test of the gravel shows these characteristics. It is deficient in particles through the ⅜ and retained on the No. 4 screen while the percentage retained on the No. 8 screen is much too heavy. However, in the amounts of the separate materials used the sieve sizing and fineness modulus is not far from the proposed 3.70. Approximately 58 per cent of the combination is retained on the No. 8, 86 per cent on the No. 48 and 97 per cent on the No. 100. This would indicate that a good theoretical sieve sizing to aim at is 3.70 as shown in Table 2 with 25 per cent on the No. 4, 40 per cent on the No. 8, 55 per cent on the No. 14, 70 per cent on the No. 28, 85 per cent on the No. 48 and 95 per cent on the No. 100. This means 15 per cent through the No. 48 and 5 per cent through the No. 100.

A few simple rules to follow in proportioning concrete for concrete products plants are:

1. Analyze the available aggregates comparatively.

2. Determine moisture content of aggregates.

3. Proportion materials by weight.

4. Use as coarse materials as possible and still obtain saleable products.

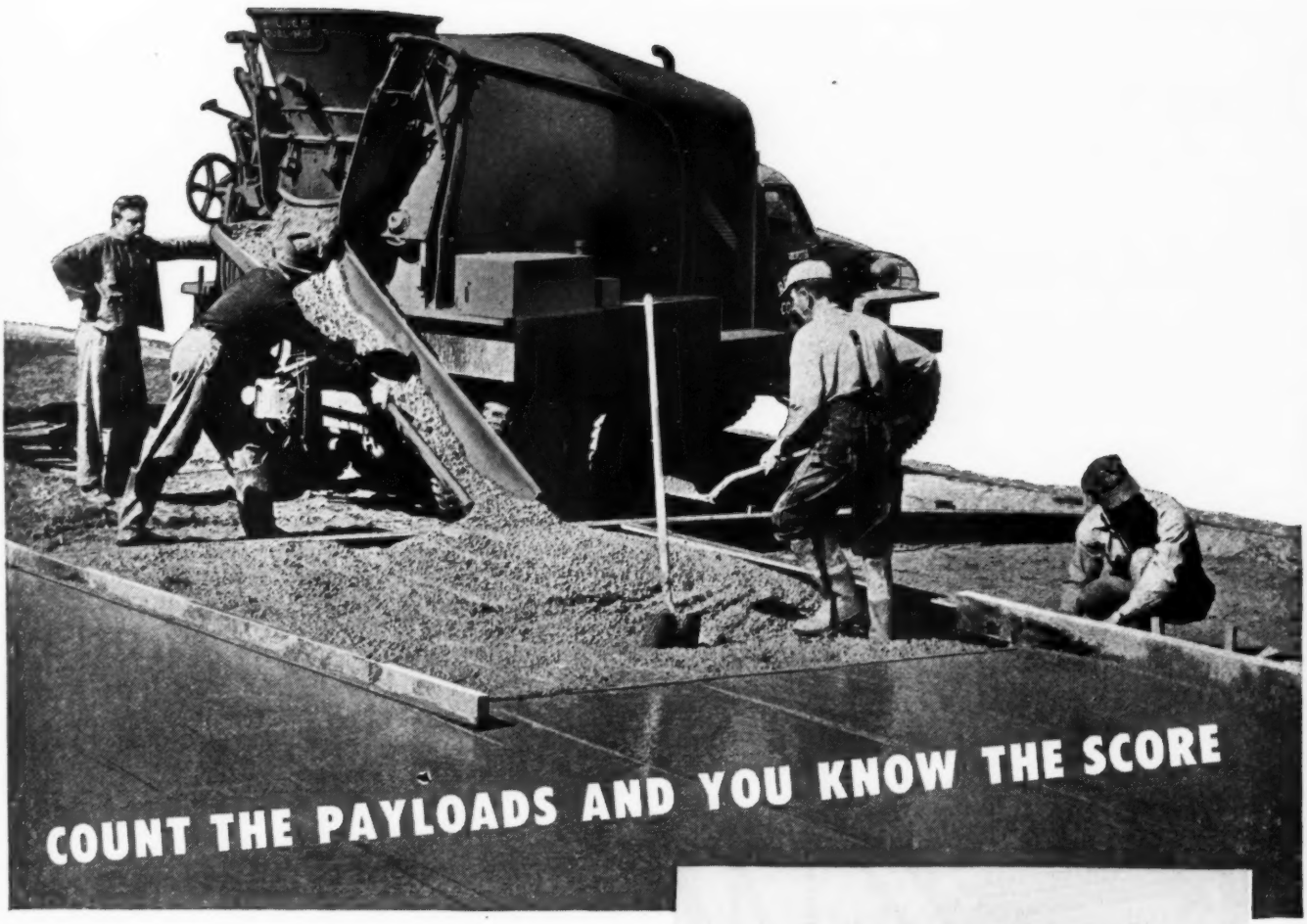
5. Use approximately 15 per cent to 20 per cent of aggregates through 48 mesh sieve and 5 per cent through No. 100 mesh sieve.

6. Use as much water as possible in mix without causing slumping of product.

7. Test finished product frequently to check up on proportioning.

New Type Crushed Rock

PRODUCTION of a new type of building material, a red-colored volcanic crushed rock, has been started by John Pearl at the Pearl Pumice Quarry, Napa, Calif. Mr. Pearl said the new material may be used for roofing, in mixing concrete, stucco, plaster or building blocks, and he predicted possible plant expansion to increase present production.



COUNT THE PAYLOADS AND YOU KNOW THE SCORE

It is no mystery why more concrete is delivered by Jaeger truck mixer than by any other method.

Successful ready-mix operators are businessmen. They know from operating records that they deliver a load of concrete *minutes* faster with a Jaeger "Speed Merchant" than with less efficient units, average fewer *hours per week* on routine maintenance and *days per year* on major upkeep of their fleets. Wet-mix plants have also found that the sealed, top-loading drum, which Jaeger has long recommended, is the only type which successfully handles a maximum payload.

These factors add up. Jaeger fleet owners average more payloads with the same plant and payroll. And they can sell every yard of their production as top-quality concrete, dual-mixed, accurately controlled for slump and delivered without segregation over any length of haul.

ONLY JAEGER OFFERS YOU THESE:

Choice of top-loading sealed drum or end-loading type

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Positive water distribution with pressure pump and grout-proof, clog-proof jet

Center drive in lifetime alignment

Engine and water system enclosed from weather

Patented "dual-mixing" action

Fully streamlined—the only modern truck mixer on the road.

● ***Send for new Catalog TM-8 showing latest models in 2-3, 3-4 1/4, 4 1/2-6 1/8, 5 1/2-7 3/8 cu. yd. sizes. We also build "Low Charge" type truck mixers, agitators.***

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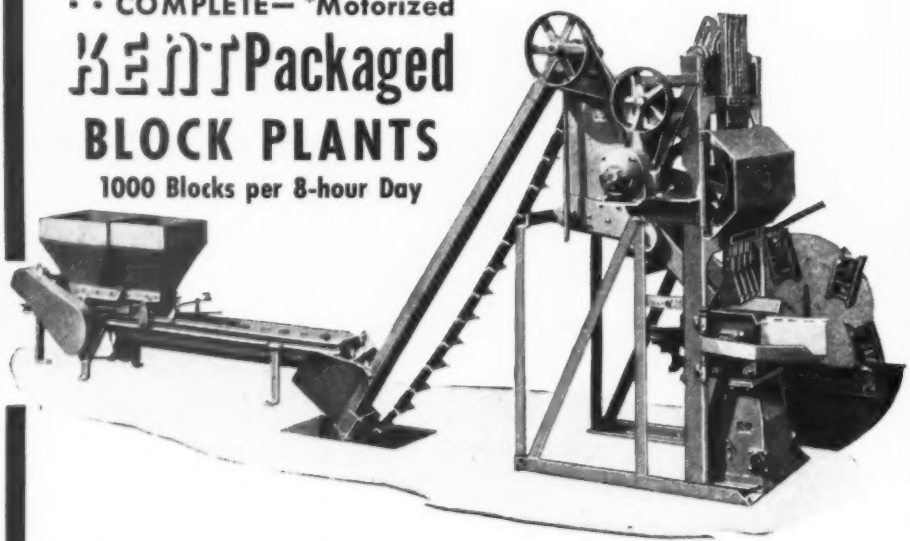
• A complete automatic cycle block maker combining vibration and tamping that responds to "PUSH-BUTTON CONTROL" and produces 300 quality blocks per hour. A rugged machine unexcelled in design, principle of operation and performance. Write for the illustrated Vibra-Tamp circular.

• • COMPLETE— *Motorized

KENT Packaged BLOCK PLANTS

1000 Blocks per 8-hour Day



• The KENT Continuous Mixer delivers well-mixed concrete in a steady stream to the KENT Elevator which raises it to the KENT Feeder. From this the concrete flows into the easily operated KENT Stripper. The pull of a lever brings the KENT Tamper into operation for speedy tamping of dense block. The hopper "strikes-off" the blocks smoothly. It is then raised by an easily operated lever and swung to one side on the "take-off". At the right of the stripper stands the KENT Dunker which keeps pallets constantly in fine condition. Furnished with 1000 pallets, 25 three-deck curing racks and lift truck.

*Larger KENT plants are available; also units for belt drive and combinations having the KENT Batch Mixer, instead of the Continuous Mixer. Use the coupon below to obtain any desired information quickly and easily.

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CUYAHOGA FALLS, OHIO, U.S.A.

Send complete information and prices as checked below.

☐ Plant illustrated above ☐ Plant with Batch Mixer

☐ Plant with belt drive ☐ Larger Complete Plants

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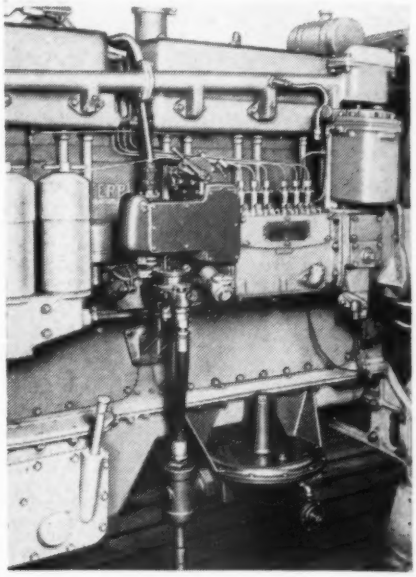
Dual-Fuel for Diesel

CATERPILLAR TRACTOR CO., Peoria, Ill., has designed a dual-fuel attachment for service with the D13000 Diesel engine. The new unit is of particular interest to engine users in or near gas producing areas. In industrial areas where "dump gas" rates prevail



Right side of Diesel engine equipped with Dual-Fuel attachment. Parts include incoming natural gas piping, pressure regulator, and special governor and injection pump group

during the Summer, this low cost gas can be used, changing back to full Diesel operation for the balance of the year or for those situations when the engine may be moved to a new site where gas is not available.

The attachment consists of special precombustion chambers, modified fuel injection pumps for metering of minute quantities of Diesel fuel, a special governor control assembly for interconnected fuel injection pump and gas throttle valve, and the necessary gas lines and pressure regulators. This attachment may be installed at the factory or in the field.

The engine is started on Diesel fuel alone and a single manually operated control lever is used to switch over to natural gas operation with pilot Diesel fuel ignition.

Seal for Glass Block

THE AMERICAN FLURESIT CO., Cincinnati, Ohio, has announced the development of the plastic Klee sealant for mortar between glass block. It coats the exterior mortar joints, adheres to the mortar and forms a tight flexible bond to the glass, expanding and contracting with the mortar as well as the glass without rupturing the film. It is available in white and several colors.

•

VERSAILLES' CONCRETE BLOCK CO., Versailles, Mo., formerly operated as a partnership between Ralph Hall and Harry Hardin, is now owned by Hardin alone.

IF THEY BUY YOUR READY-MIX THEY'LL RENT YOUR FORMS!

Tap a profitable market with little extra effort. The very same people who use your concrete should be renting ATLAS SPEED FORMS from you.

Atlas Speed Forms can increase your business and profits. They can increase the business and profits of the contractors you deal with. And this proposition is mighty easy to demonstrate.

You can rent Atlas Speed Forms to the contractor for LESS than wood forms would cost him, and still make a handsome PROFIT!

The compact and sturdy Atlas Speed Forms take mighty little of your yard space. Form their own sheds. No maintenance problem. And you can re-use them indefinitely! Saves your trucks time. You'll know the forms are ready and waiting when your trucks arrive.

Write today, fill out the coupon. We'll *rush* additional information to you.

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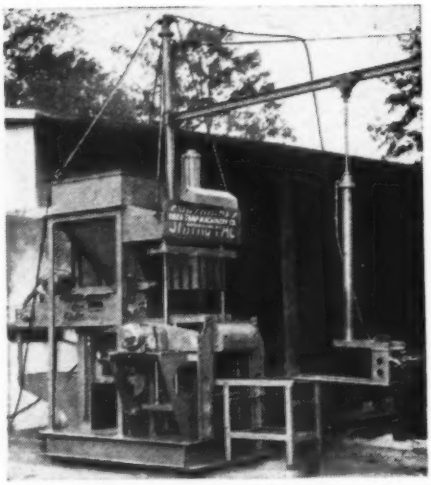
High Capacity Block Machine

VIBRA-TAMP MACHINERY CO., Greensboro, N. C., has developed the Syntro-Pac block machine which has a capacity of 500 8- x 8- x 16-in. block per hour or equivalent production in other sizes. The Metropolitan Equipment Co., Washington, D. C., is the sales distributor for this company.

It is said to be a fully automatic, plain pallet block machine. A feature of this machine is the automatic pallet magazine, holding 120 pallets. Cleaning and oiling of each pallet is done as it is fed into the machine.

To make various types of units, quick change attachments are available to permit manufacture on a plain pallet, size 18- x 18-in. Modular sizes with both oval or rectangular cores, two-core or three-core units can be manufactured as well as drain tile, according to the manufacturer. The machine is designed for one-man operation.

The machine operator who does all the offbearing has complete control of the machine at the offbearer. The machine is also equipped with a simple electrical timer which is easily adjustable, varying the time of the cycle and the machine output, this adjustment being made to fit the materials being run and the operator's ability to handle the block from the machine to the racks.



Automatic pallet feed

Vibration equipment comprises eccentrics driven by two 1½-hp., 3-phase motors, equipped with electric brakes. The agitator is driven by 1½-hp., 3-phase electric motor. Air cylinders are automatically lubricated and operated by solenoid controlled valves.

The machine is controlled by limit switches operated on 110-volt circuit; the switches in turn operating the solenoid air valves and the three 220-volt electric motors. The storage hopper is of large capacity made of ¼-in. steel plate, also lined with ¼-in. thick liner plates. All wheels on the machine are sealed ball bearing; lubrication throughout where needed, alemite. Approximate weight of the machine is 9000 lbs.

The Metropolitan Equipment Co., Washington, D. C., is under the management of J. A. Finfrock, well-known throughout the East in the cinder and concrete block industry, both as a plant engineer and plant designer. He formerly represented the Stearns Manufacturing Co.

Iron Slag Brick, Block, and Slabs

TWO NEW PROCESSES for making brick, block and slabs from iron slag have been patented by Adam Sassur, Chicago, Ill., using acid blast furnace slag.

Basic process slag has a large amount of phosphoric acid. In the basic process, the furnace lining is neutral. In dephosphorizing, burnt lime is added to remove the phosphorus.

In the acid process, the lining is siliceous and no lime is required. The open hearth process may be either acid or basic according to the lining. The only difference between the basic open hearth and the acid process is in the bottom material, and the different slag carried by the two methods.

In the acid process, slag is formed by the silica, from oxidation and from ore. Composition of slag depends upon the grade of iron to be made and the raw material available. Modern plants run the slag into pits 20- x 20- x 20-ft., and granulate it by allowing a stream of water to strike it when leaving the trough at the mouth of the pit.

Manufacture of the slag brick or block can be made with any sand-lime machinery. In the first process, calcium oxide 2½ per cent and calcium sulphate 2½ per cent are used. The brick go through an 8-hr. curing process under 120 lb. steam pressure for hardening and drying.

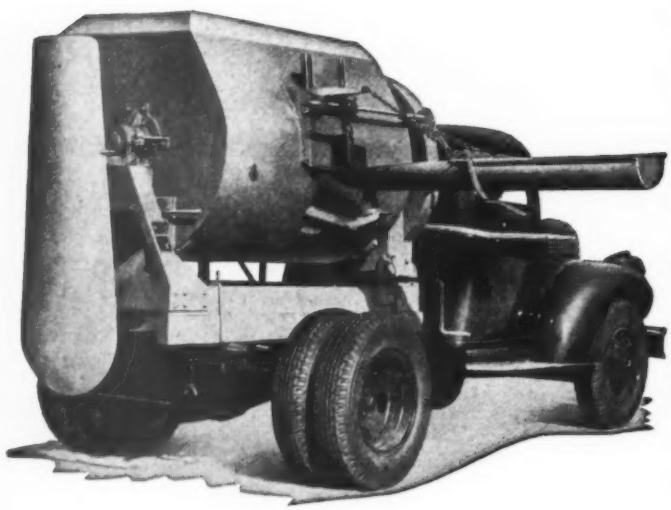
In the second process, cement is used in place of calcium oxide, and the curing can be made by low steam pressure from 2 to 6 atmospheric pressure, or by heat. Calcium sulphate by steam curing gets almost as hard as marble, the cost of the hardening material in the binder being 40 per cent less by this process than in any other process in use, it is claimed.

The slag must pass through a ½-in. screen as small lumps of iron occasionally are mixed with it. The slag also must go through a dry-pan before or after mixing before being pressed into brick or block.

Brick, block and slab manufactured by the two processes are claimed to be almost indestructible, since iron slag has an alkaline reaction, making it impossible to produce acid corrosion; and sulphur compounds in slag under heat take the form of sulphides, which under the alkaline condition of slag do not give rise to other compounds having an injurious effect. It neutralizes acid and forms a salt with it.

The New **HIGH DISCHARGE**

Transport **TRUCK MIXER**



★ FAST OPEN TOP CHARGING
★ FULL VIEW INSPECTION
★ SUPERIOR MIXING PRINCIPLE
★ INSURES QUALITY CONCRETE
★ ALL STEEL CONSTRUCTION
★ LOW MAINTENANCE
★ ALL BEARINGS FULLY PROTECTED
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CONCRETE TRANSPORT MIXER COMPANY, INC.

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Distributors

for the

Syntro-Pac Fully Automatic Plain Pallet Block Machine

Manufactured by the Vibra-Tamp Machinery Co., of Greensboro, N.C.

Capacity
500
8x8x16″ Block
Per Hour
Or their equivalent

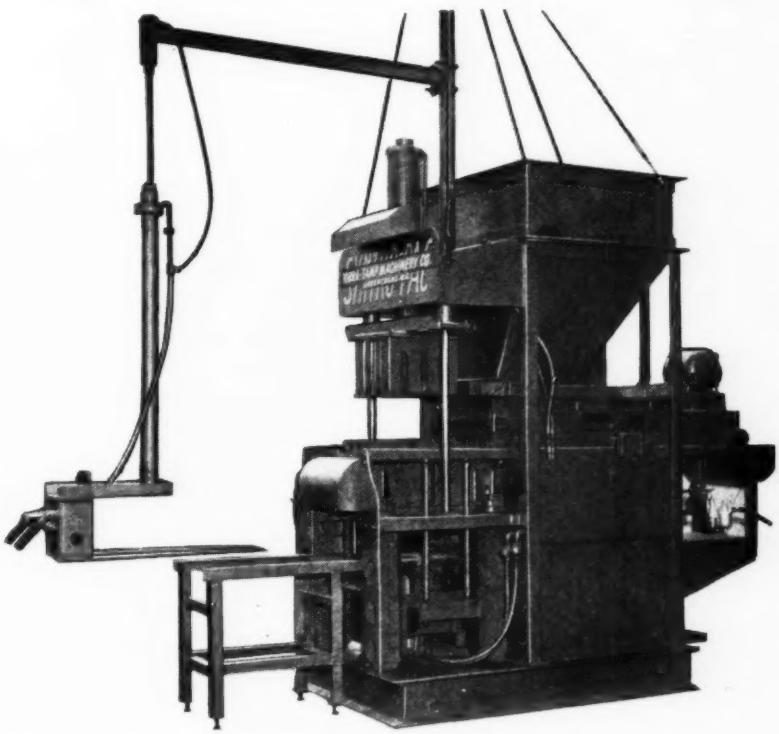
●

A Truly One Man
Fully Automatic
Machine

●

Essentially a Replacement Machine producing accurately dimensional fully compacted block, sold under a one-year guarantee.

●



Quick change attachments available for making all type units that can be produced on a plain pallet, size 18″x18″, including drain tile or modular size, oval or rectangular core, two core, or three core.

●

Simplicity of CHANGE - OVER from one set-up to another accomplished in less than 10 minutes.

●

No other machine within its price range can boast of these features.

●

We invite comparison.

AUTOMATIC PALLET MAGAZINE holding 120 Pallets — Cleaning and oiling each pallet as it is fed into the machine.

●

Prices upon request.

Sold by the

Metropolitan Equipment Co.

Telephone HObart 5165

P.O. Box 4465 **Washington 17, D. C.**

New and Used
Block Machines

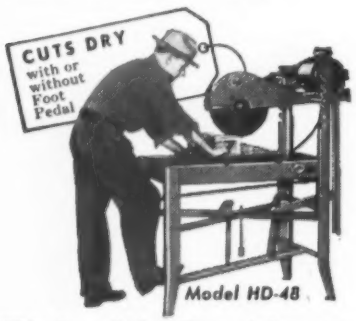
Block Plants Fully Equipped

New and Used
Pressed Steel and Cast Iron
Pallets of all sizes

FASTER CUTTING

WET or DRY with the NEW HD 48 CLIPPER Masonry Saw

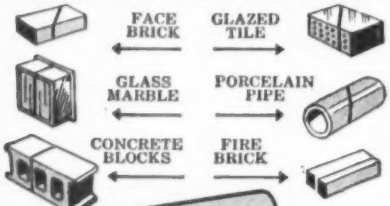
You'll be amazed how quickly and easily you can cut virtually any special length or shape from the hardest masonry materials. Clippers save time — save material, assure better workmanship on every job.



With the exclusive Clipper design, proven throughout the world and guaranteed to provide the fastest cutting speed and the lowest cutting costs.

DUSTLESS MASONRY CUTTING so fast and easy. Just turn on the circulating water system and slice through the hardest masonry materials. Foot Pedal control for varying material sizes or lock the cutting head at a set position, whichever is desired.

CLIPPER MAKES THESE CUTS IN SECONDS



FREE TRIAL
In keeping with our policy for the 10th consecutive year, you can have a Clipper on Trial. Clippers for Every Job priced as low as $195... write for Catalog, Today!

THE CLIPPER MFG. CO.
2807 WARWICK • KANSAS CITY 8, MO.
PHILADELPHIA CLEVELAND ST. LOUIS AUSTIN, TEX.

Traveling mold on wheels and track with reinforcing being placed ready for the final pass through the joist machine

Long Concrete Joists

(Continued from page 149)

Users of this joist machine point out the necessity of having steel pallets in one continuous piece, for attempts to weld pallets to make up the long sections at the end butt welds results in a slight deformity in the resulting concrete joist that is not countenanced by the Formigli Corporation. These new pallets were supplied by the Bethlehem Steel Co. All reinforcing rods for the different sized concrete joists manufactured are made from A.S.T.M. intermediate grade new billet steel and cut to length by steel fabricators. Each job is given a lot number, and the steel ordered for that job is tagged and used only for the purpose intended. Thus there is no slip-shod use of random lengths of reinforcing rods. Welding of short lengths into long is not permitted. As an example, the steel for a 40-ft. joist is cut to the maximum length needed and no fillers used. After curing, the joists are tagged with a sticker carrying the essential data relating to the original order. Both Haydite and Waylite are used for the lightweight joists with crushed trap rock aggregate employed where weight is not a consideration.

The joist machine is housed in a new structure, approximately 30- x 140-ft. with a 30- x 40-ft. offset near the center line of the machine. This latter area is for the ground storage of aggregate and the mixing equipment. Sacked cement in cloth bags is used. The plant is located along the Reading Railroad tracks.

Beside the Lithibar unit, the company devotes several sections of its plant to the manufacture of Channelcrete roofing slabs in a wide assortment of lengths and widths. Several vibrating machines are used for the manufacture of roofing slabs. A large stock of steel forms for this work is carried in storage, and the concrete remains in these forms until strong enough to handle.

Joists are made in 6-, 8-, 10-, 12- and 14-in. sizes using the same basic form for all sizes by means of inserts. Lengths can be any size up to the maximum length of the machine. The amount of reinforcing varies with the size of the member. The tabulation shows the amount of steel in square inches in both bottom bars for the beam size indicated:

Size of Joist	Minimum Sq. In.	Maximum Sq. In.
6-in.	.22	0.6
8-in.	.22	0.88
10-in.	.30	1.2
12-in.	.50	1.39
14-in.	.75	2.0

The company had its operating offices at the Williamstown Junction plant and a sales and engineering office in Philadelphia, Penn.

Otto Formigli, president of the company, is in charge of research and production; Paul Formigli is in charge of sales and engineering; and Theodore Formigli is again with the company after having spent 13 years on the Pacific Coast. Andrew J. Sundstrom is engineer.

Distortion from Welding

WHEN AMOUNT OF WELD metal to be deposited is large in proportion to parent metal in building up worn surfaces with arc welding, it is possible to minimize distortion if certain precautions are noted. If the surface to be built up is not smooth, it should be ground; and if permissible, the parent metal should be pre-heated to unlock stresses. Electrode size should be small, with current kept in mid-range to prevent excessive heating.

Beads should be kept thin, well peened and only small areas should be covered between peenings. Adjacent beads should overlap about 40 per cent and alternate layers laid at right angles. Pressure on the wire brush between welds will help yield sound metal build-up, according to General Electric engineers.

Vault Display

BERG VAULT SYSTEM is conducting an "Open House" for persons interested in burial vaults, at the National Concrete Masonry Association convention to be held March 1-3 at the New Yorker Hotel, New York, N. Y.

DELAWARE BLOCK CO., Dover, Del., has been incorporated listing a capital of 2000 shares, no par value.

Material Handling

(Continued from page 153)

A red mineral pigment is added to concrete brick on special orders, in the proportions of 6 lb. pigment per bag of cement. The front of the storage yard along the highway has a display of concrete garden furniture in one corner. This furniture is made of sand and gravel aggregate at the Paducah burial vault plant. Deliveries of block, brick and garden furniture, covering a 100-mile radius from the plant, are handled by contract haulers.

Equipment Details

The highly flexible car-unloader is a Farguhar, powered by a 3-hp. Howell electric motor. Motors on the Besser Super Vibrapac, Besser mixer and skip hoist are all General Electric. The Besser off-bearer is air-powered by a Quincy air compressor, powered by a 5-hp. Century motor. A Lewis-Shepard hand-operated lift truck is used for rack spotting about the machine and other odd jobs; while loaded racks and cubes are handled by an Erickson platform truck and a Towmotor fork lift truck. Aggregate is transported by a Butler Bin car scoop. All three of the last mentioned trucks are rubber-tire mounted and gasoline-engine powered. McDonnell & Miller automatic controls are used exclusively on the Kewanee high pressure boiler, which is coal-fired by an Iron Fireman stoker. Ricketson Mineral Color Works supplied mineral pigment for the red concrete brick.

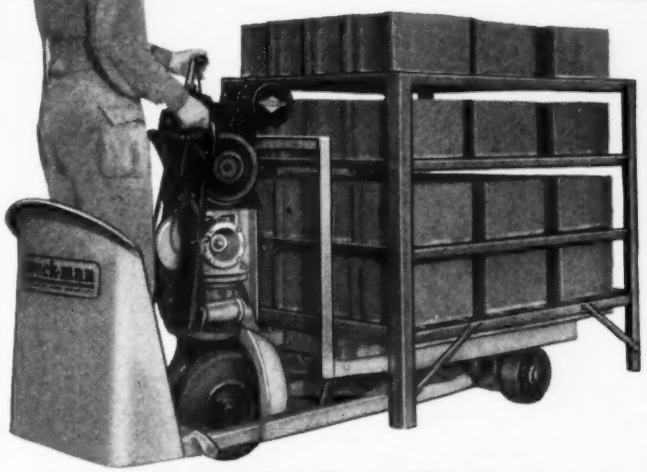
Officers

George W. Katterjohn is head of the firm bearing his name, with offices in Paducah, Ky. Lawrence Riggs is superintendent and Doug Williams is manager of the new Owensboro plant.

High pressure boiler has automatic water feed, control and shut-off. Alarm bell rings if safety pin on stoker shears off

truck-man

BUILT TO DO BLOCK JOBS BETTER



ASK ANY OPERATOR

$775

f.o.b. factory

Yes, for SAFER, FASTER, BETTER handling of concrete blocks—Truck-Man has what block manufacturers demand:

- Ample capacity—many carry over 60 blocks.
- Easy lift and drop, soft start and stop—handles green blocks gently.
- Hydraulic lift and gasoline power—ease and speed handling.
- Cat-like maneuverability possible only with 360° steering.
- Easy on-and-off, simple and safe operation by unskilled drivers.
- Low first cost, low operating cost, low maintenance cost.

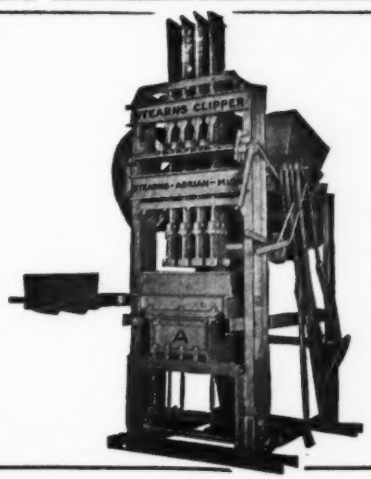
Ask the Truck-Man dealer in your territory about performance, service and economy, or write us for catalog.

TRUCK-MAN'S BLOCK MACHINERY SPECIALISTS

Anchor Concrete Mach. Co. Columbus, Ohio
A. N. Olsen Rock Rapids, Iowa
Blatt Sales Co. Tampa, Fla.
Clark-Wilcox Co. Boston, Mass.
Concrete Block Plant Equip. Co. Birmingham, Ala.
Concrete Transport Mixer Co. St. Louis, Mo.
Contractors Mach. & Equip Co. Hamilton Ont., Canada
C. H. Jones Equip. Co. Salt Lake City, Utah
C. J. Rahn Co. Newark, N. J.
E. B. Kelly, Inc. Farmingdale, L. I., N. Y.
Fleming Mfg. Co. St. Louis, Mo.
F. C. George Machine Co. Orlando, Fla.
Lith-I-Bar Co. Holland, Mich.
Llewellyn Mach. Corp. Miami, Fla.
Monroe Concrete Block Mach. Co. Monroe, Mich.
Sterns-Oakes Sales Co. Adrian, Mich.
Siano & Sons Greenfield, Mass.

truck-man INC.

1413 West Ganson, Jackson, Mich.



"ANCHOR"

Complete equipment for making concrete, cinder and other light weight aggregate units, including engineering service for plants and revamping of old ones for more economical service. Stearns Clipper Stripper Machines, Stearns Joltcrete Machines; Stearns Mixers; cast Iron and Press Steel Pallets. Straublox Oscillating Attachments, etc.

Repair parts for: Anchor, Stearns, Blystone Mixers and many others.

ANCHOR CONCRETE MCHY. CO.

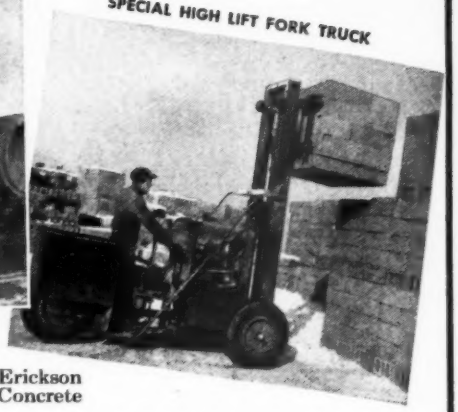
G. M. Friel, Mgr., Columbus 8, Ohio

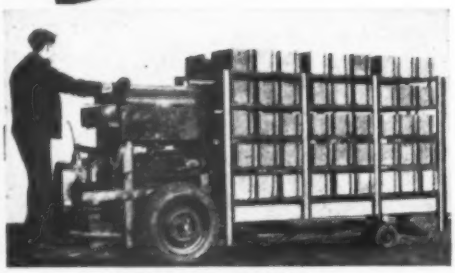
Erickson POWER LIFT TRUCKS

STANDARD HIGH LIFT FORK TRUCK

"SUPER-SPECIAL" HIGH LIFT FORK TRUCK

SPECIAL HIGH LIFT FORK TRUCK





PLATFORM TYPE TRUCK

UPPER LEFT—Standard High Lift Erickson Fork Truck handling concrete slabs. Concrete Plank Co., Inc., Jersey City, N. J.

CENTER—"Super-Special" High Lift Erickson Fork Truck for extra heavy loads, shown with an 84" concrete pipe section. N. D. Concrete Products Co., Bismarck, N. D.

UPPER RIGHT—Special High Lift Erickson Fork Truck, building stockpile 3 cubes high. Increases output, saves time, lowers yard handling costs, eliminates chipping or breakage. Little Rock Lumber & Coal Co., Alma, Mich.

LEFT—Platform Type Erickson Power Lift Truck, handling rack of 90 blocks 8x8x16 over ordinary unpaved runways. The Connecticut Valley Block Co., West Springfield, Mass.

Each Erickson Power Lift Truck is individually designed for the work it is to do. Write for literature, tell us your needs.

See us at the
N.C.M.A. Convention
Hotel New Yorker
New York—March 1-2-3

ERICKSON SPECIAL EQUIPMENT MFG. CO. 1405 Marshall St. N. E., Minneapolis 13, Minnesota

It's New!!
Challenger
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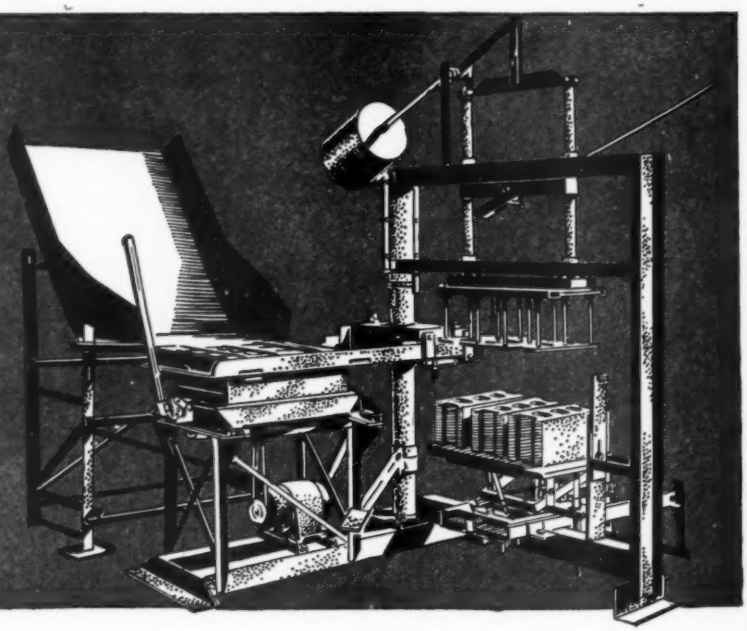
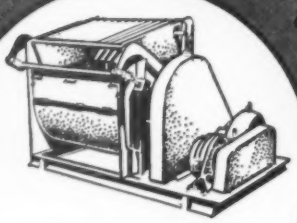




12 CU. FT. CEMENT MIXER

AVAILABLE NOW!

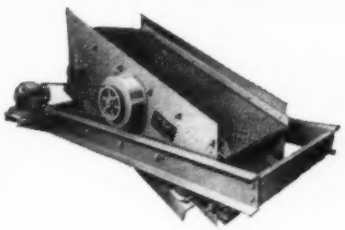
Rugged—Dependable—Block machine. Simplified for use by the average man for greatest block production per man hour. Easy to produce 2500-8"x 8"x 16" blocks in eight hours. A trouble free—compact unit.

Stephen Flam, Inc.
15026 OXNARD ST., VAN NUYS, CALIF.

LINK-BELT PREPARATION UNITS

for higher efficiency—lower production costs

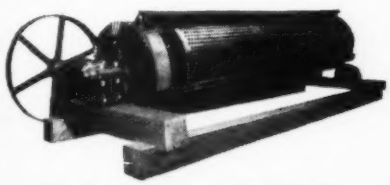
VIBRATING SCREENS



Link-Belt builds all types and sizes of vibrating screens for sand-gravel-stone and other non-metallics.

CONICAL WASHING SCREENS

For screening and scrubbing with low operating and maintenance cost.



REVOLVING SCREENS

Available in a wide range of sizes and capacities — plates with one or several sizes of perforations.

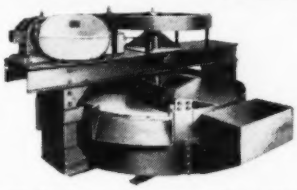
SCRUBBERS

In combination with screens, Link-Belt scrubbers offer efficient and low-cost cleaning.

SHAW SAND CLASSIFIERS

For cleaning and classifying sand. Will also make such special grades as asphalt, filter, engine, gypsum and glass sand.

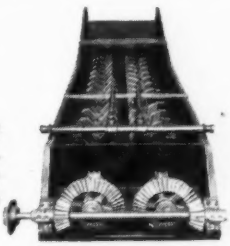
DEWATERING ROTOSCOOP



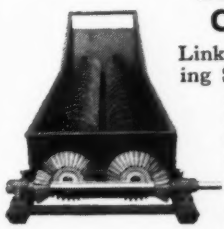
An efficient, compact, self-contained dewatering unit for all types of sand.

LOG AND SCREW WASHERS

A number of types of Link-Belt washers for gravel and stone are available.



DEWATERING CONVEYORS



Link-Belt Dewatering Screw Conveyor available in either single or double screw units. Link-Belt Dewatering Flight Conveyors are also available.

• The stringent specifications for sand, gravel, and stone require accurate separations. With the tremendous demand for construction materials, it is important that you have the most efficient and lowest-cost equipment.

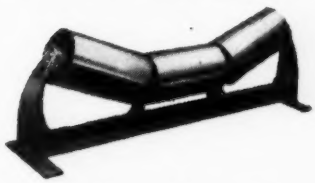
Let us talk over your problem, whether you are interested in a new plant or equipment for modernization of present layout.

LINK-BELT COMPANY

Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8.

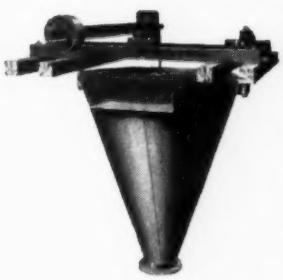
Offices in Principal Cities. 10,568 B

BELT CONVEYORS

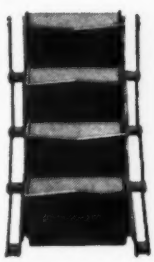


Link-Belt belt conveyors have long been known for high performance and low-cost operation. We also manufacture all accessories such as trippers, belts, pulleys, bearings, take-ups, etc.

SAND SEPARATORS



Automatic conical sand separators for practical, low-cost, thoroughly reliable separation.

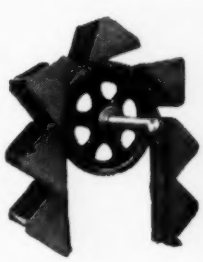


DIGGING ELEVATORS

A low-cost method of picking up sand and gravel from primary sump. Designed for long wear.

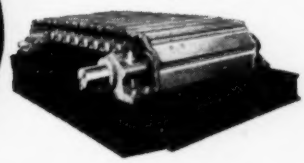
BUCKET ELEVATORS

Available in many types to suit various service requirements.



FEEDERS

Link-Belt feeders are made in the apron, belt, grizzly and reciprocating types.



LINK-BELT

SAND AND GRAVEL HANDLING AND PREPARATION EQUIPMENT